PROCEEDINGS

Eighty-Fourth Annual Conference

OF THE

American Railway Bridge & Building Association

1979

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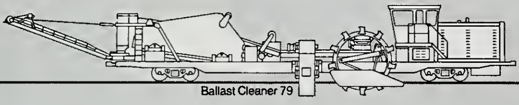
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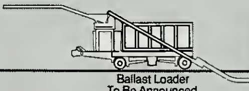
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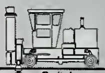
To Be Announced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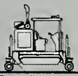
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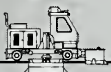
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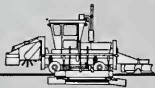
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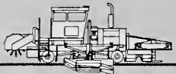
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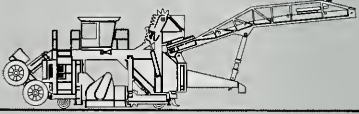
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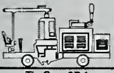
Ties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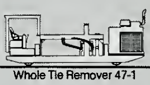
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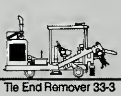
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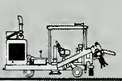
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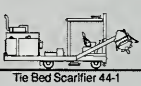
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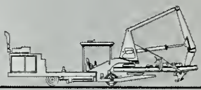
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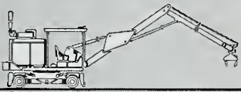
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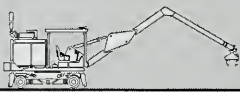
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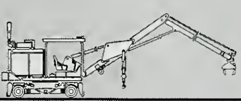
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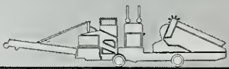
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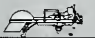
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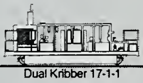
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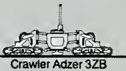
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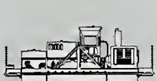
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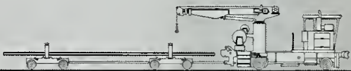
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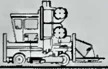
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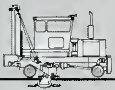
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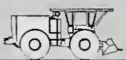
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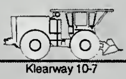
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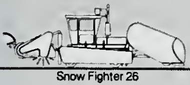
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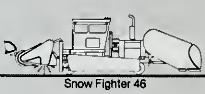
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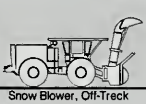
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Berwick Bay Bridge Morgan City, La.	1970
Rob Roy Bridge Pine Bluff, Ark.	1970
Rock Island Bridge Little Rock, Ark.	1970
Willow Avenue Bridge Cleveland, Ohio	1964
Ohio Street Bridge Buffalo, N. Y.	1961
Arthur Kill Bridge Staten Island, N. Y.	1959
Wabash R. R. Bridge Valley City, Ill.	1959
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The Canal Street Bridge Chicago, Ill.	1948
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Cape Cod Canal Bridge Buzzards Bay, Mass.	1935

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Proceedings of the

Eighty-Fourth Annual Conference

of the

American Railway
Bridge & Building
Association

Held at

ATLANTA, GEORGIA

October 15-18, 1979

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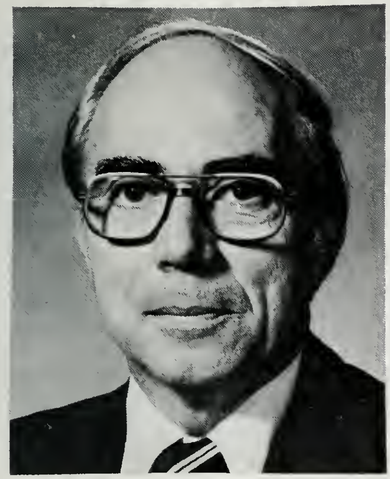

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REMSA EXHIBITS IN ATLANTA

The Railway Engineering-Maintenance Suppliers Association, staged their exhibit in Atlanta, Georgia, October 15 to 18.

The exhibit was the most complete International exhibit of railroad engineering and maintenance of way equipment and suppliers ever put on in the United States.

The exhibit was held both indoors and outdoors. The indoor exhibits were held in the World Congress Center. Much interest in these exhibits was shown as the aisles were busy with people looking and asking questions.

The outdoor exhibit was on the tracks of the Industry Yard of the Central of Georgia Railroad (Southern).

Picture of the exhibits in the World Congress Center taken from the REMSA suite at the Center above the exhibition area.

Another picture taken from the floor above the exhibit at the World Congress Center.

Here the machinery was permitted to operate so that the viewers could see the equipment in actual operation.

The equipment of both shows showed the tremendous strides made by the railroad supply industry in their sophisticated equipment.

Due to the energy shortage, more and

Picture taken at the REMSA "Operating Track Show." Included in those in the picture is Ann Wilson, secretary for both the Roadmasters and Maintenance of Way Association and the American Railway Bridge and Building Association.

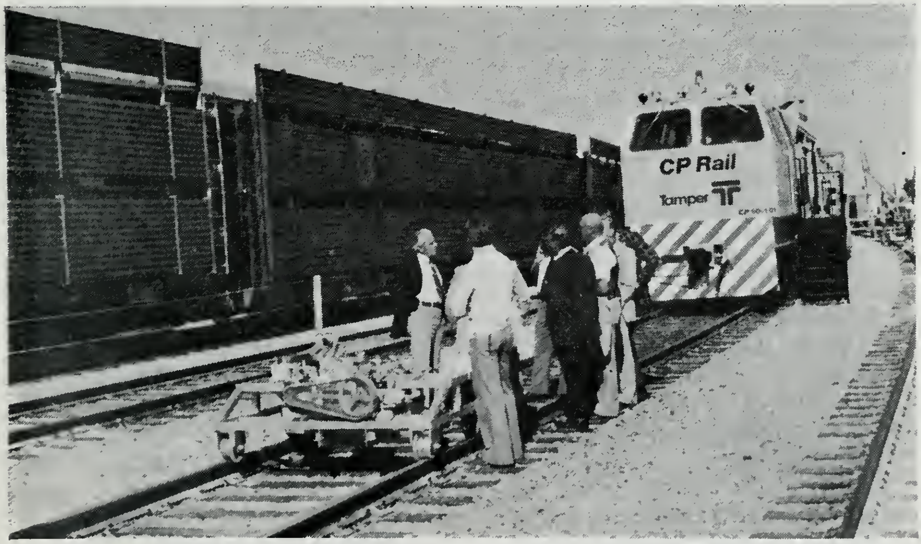
Another view of the outdoor exhibits. Note the flags.

more materials will be shipped by rail. REMSA, realizing this, has produced more and more labor-efficient automatic equipment to be used in repairing and renewing of railroads.

About one hundred and forty exhibitors showed equipment and products.

Before this exhibit the Railway Engineering-Maintenance Suppliers' Association has always been held in Chicago.

Another view of some of the equipment and people viewing it.



Some of the officers of the two associations viewing the equipment.

Another view of the equipment at the Southern Industry Yards.

Getting the equipment to Atlanta and in place for both the indoor and outdoor exhibits was a feat in itself.

The weather co-operated with REMSA '79 in that getting out in the warm sunshine in the afternoons to see the equipment at the Industry Yards made it look even better.

As usual, the annual REMSA banquet on Wednesday night and the following entertainment was enjoyed by those attending the concurrent technical conventions of the Roadmasters and Maintenance of Way Association and the American Railway Bridge and Building Association.

The following is the list of exhibitors:

EXHIBITING MEMBERS — 1979 — RAILWAY ENGINEERING MAINTENANCE SUPPLIERS ASSOCIATION, INC.

A&K RAILROAD MATERIALS, INC.
74th & Holiday Drive
Kansas City, Kansas 66106

ABEX CORPORATION
Railroad Products Group
Valley Road
Mahwah, New Jersey 07430

AMSCO DIVISION OF ABEX CORP.
389 East 14th Street
Chicago Heights, Illinois 60411

AEROQUIP CORPORATION/
INDUSTRIAL DIV.
300 South East Avenue
Jackson, Michigan 49203

ALLEGHENY DROP FORGE
COMPANY
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2707 Preble Avenue
Pittsburgh, Pennsylvania 15233

AMERICAN ALLOY STEEL, INC.
2070 Steel Drive
Tucker, Georgia 30084

ARTHUR RAILROAD SPIKELOCK CORP.
16351 Royal Hills Drive
Encino, California 91436

ATLANTIC MAINTENANCE OF WAY
Division of Rock-Mill, Inc.
5602 Pike Road
Rockford, Illinois 61111

ATLANTIC R.R. SUPPLY CO.
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Tamarac, Florida 33320

AUTOMATION INDUSTRIES, INC.
Sperry Rail Service Division
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111 E. Wacker Drive
Chicago, Illinois 60601

CHEVRON CHEMICAL CO.
1728 Montreal Circle
Tucker, Georgia 30084

CIBA-GEIGY CORPORATION
Industrial Division
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Greensboro, North Carolina 27409

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1520 4th Street S.W.
Calgary, Alberta T2R 1H5

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c/o Mitsui & Co., 200 Park Avenue
New York New York 10017

DAVIDSON-KENNEDY COMPANY
1090 Jefferson St., N.W.
Atlanta, Georgia 30318

DESA INDUSTRIES
A Unit of AMCA International Corp.
25000 South Western Avenue
Park Forest, Illinois 60466

DEUTZ CORPORATION/ ENGINE DIVISION
7585 Ponce de Leon Circle
Atlanta, Georgia 30340

DU PONT COMPANY
1007 Market Street
Wilmington, Delaware 19898

DU PONT - EXPLOSIVES DIV.
1007 Market Street
Wilmington, Delaware 19898

EFSA
P.O. Box 8, CH-1599
Chatillens, Switzerland

ELANCO PRODUCTS COMPANY
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Indianapolis, Indiana 46268

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115 E. Joppa Road
Baltimore, Maryland 21204

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2381 Philmont Avenue
Bethayres, Pennsylvania 19006

FAIRMONT RAILWAY MOTORS
Division of Harso Corp.
Fairmont, Minnesota 56031

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Post Falls, Idaho 83854

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L. B. FOSTER COMPANY
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Pittsburgh, Pennsylvania 15220

THE FOUNDATION EQUIPMENT CORP.
100 Elizabeth Street
Newcomerstown, Ohio 43832

GKN INTERNATIONAL, INC.
Godwin Warren Engineering Ltd.
22 Kingsway
London WC2, England

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Dresser Industries, Inc.
Galion, Ohio 44833

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Wabash, Indiana 46992

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Desloge, Missouri 63601

THE GOODYEAR TIRE & RUBBER CO.
1144 E. Market Street
Akron, Ohio 44316

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Pittsburgh, Pennsylvania 15221

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Hopkins, Minnesota 55343

HATZ DIESEL OF AMERICA, INC.
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New Berlin, Wisconsin 53151

HERZOG CONTRACTING CORP.
1900 Garfield Avenue
St. Joseph, Missouri 64503

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Atlanta, Georgia 30326

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Railweld Division
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Chicago Heights, Illinois 60411

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1872 Cherry Street
Montgomery, Alabama 36107

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2378 Holly Lane
Ottawa, Canada K1V 7P1

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El Paso, Texas 79930

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Schaumburg, Illinois 60195

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Pittsburgh, Philadelphia 15219

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Grand Rapids, Michigan 49506

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504 Malcolm Avenue, S.E.
Minneapolis, Minnesota 55414

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556 East 56 Hiway
Olathe, Kansas 66061

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Des Moines, Iowa 50333

LOMBARDINI ENGINES, INC.
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Doraville, Georgia 30340

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3900 Arrowhead Drive
Hamel, Minnesota 55340

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Chicago, Illinois 60612

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A Div. of the Marmon Group, Inc.
Governor John Sevier Highway
Knoxville, Tennessee 37901

MATIX SAFERAIL
Rte. d'Oron 2
1010 Lausanne, Switzerland

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P.O. Box 112
Millbury, Massachusetts 01527

MOBILE INTERNATIONAL CO., INC.
P.O. Box 45036
Tulsa, Oklahoma 74145

MODERN RAILROADS RAIL TRANSIT
5 S. Wabash Avenue
Chicago, Illinois 60603

MODERN TRACK MACHINERY
1061 Davis Road
Elgin, Illinois 60120

MONSANTO TEXTILES CO.
800 No. Lindbergh Boulevard
St. Louis, Missouri 63166

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71 Temple Street, Owego
Tioga County, New York 13827

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Alco Spring Industries, Inc.
Two Morrison-Knudsen Plaza
Boise, Idaho 83729

THE NOLAN COMPANY
300 Boyce Drive
Bowerston, Ohio 44695

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Ogden, Utah 84402

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Moorestown, New Jersey 08057

OSMOSE - RAILROAD DIVISION
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Madison, Wisconsin 53716

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Bridgeport, New Jersey 08014

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Lake Zurich, Illinois 60047

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Richmond, California 94802

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Chicago, Illinois 60606

PLASSER AMERICAN CORP.
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New York, New York 10001

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Railway Products Division
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RMC Division, Pittsburgh, Pa. 15230

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Chicago, Illinois 60606

PRORAIL/STEDEF
7657 Leesburg Pike
Falls Church, Virginia 22043
92100 Boulogne, France

QUAKER R.R. EQUIPMENT SALES CORP.
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Havertown, Pennsylvania 19083

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Phoenix, Arizona 85005

R B INDUSTRIES, INC.
P.O. Box 16901
Tampa, Florida 33687

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Roxboro, North Carolina 27573

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Racine, Wisconsin 53404

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Maplewood, New Jersey 07040

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15 Spinning Wheel Road
Hinsdale, Illinois 60521

THE REINFORCED EARTH COMPANY
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Washington, D C. 20037

REXNORD, INC.; NORDBERG MACHINERY GROUP
Railway Equipment Division
P.O. Box 383
Milwaukee, Wisconsin 53201

SAFETRAN SYSTEMS CORPORATION
Tesco Track Division
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Louisville, Kentucky 40214

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500 Hopper Street
Petaluma, California 94952

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8952 Schlieren, Switzerland

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Fort Worth, Texas 76114

STRUCTURAL RUBBER PRODUCTS CO.
P.O. Box 2439
Springfield, Illinois 62705

SUPERIOR ROPE & SLINGS, INC.
1098 Huff Road, N.W.
Atlanta, Georgia 30318

SWEDISH RAIL SYSTEM AB SRS
P.O. Box 1031
Solna, Sweden

SZARKA ENTERPRISES, INC.
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Livonia, Michigan 48151

3M COMPANY
Industrial Specialties/
Decorative Products
3M Center
St. Paul, Minnesota 55101

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2525 Gardner Road
Broadview, Illinois 60153

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Tequesta, Florida 33458

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846 South Central Avenue
Atlanta, Georgia 30354

TRUE TEMPER CORPORATION
Railway Appliance Division
1623 Euclid Avenue
Cleveland, Ohio 44115

THE UNION FORK AND HOE COMPANY
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Columbus, Ohio 43216

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Chicago, Illinois 60606

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Louisville, Kentucky 40214

UNITED STEEL & FASTENERS, INC.
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Elk Grove Village, Illinois 60007

U.S. THERMIT INC.
Pacific Railway Sales
Ridgeway Boulevard
Lakehurst, New Jersey 08733

RAILROAD FRICTION PRODUCTS CORP.
Wilmerding, Pennsylvania 15148

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Milwaukee, Wisconsin 53209

THE WARREN GROUP
P.O. Box 791
Warren, Ohio 44482

WESTERN SLING CO.
4950 Colorado Blvd.
Denver, Colorado 80216

WESTERN STATES SUPPLY COMPANY
4519 South 134th Street
Omaha, Nebraska 68137

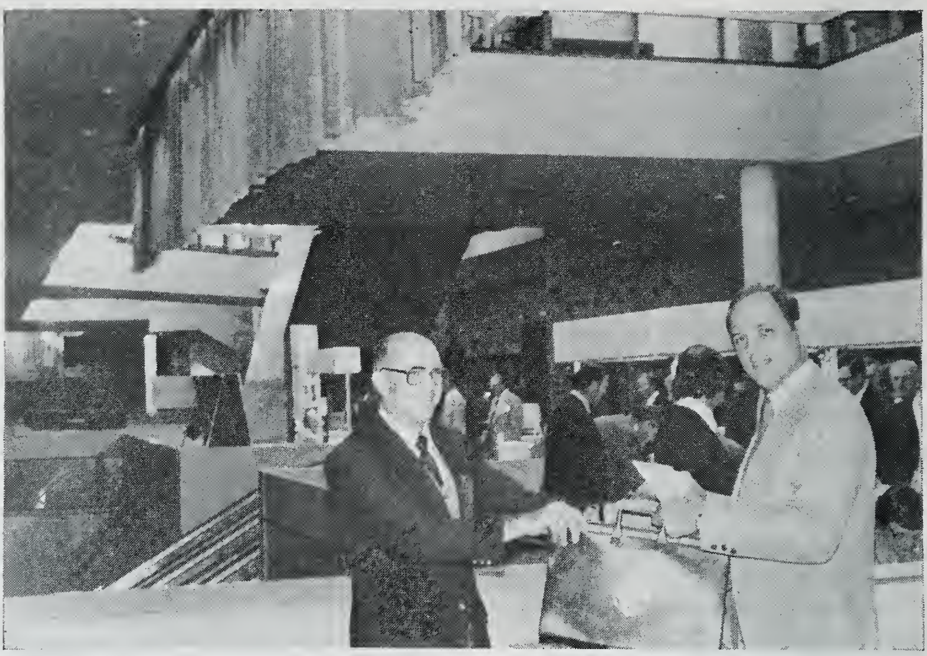
THE WHITMAN COMPANY
Ingersoll Locks
P.O. Box 1105, Linden Hill Station
Flushing, New York 11354

WINTER'S RAILROAD SERVICE, INC.
11302 Route 75 at Langford
North Collins, New York 14111

WOODBINE CORPORATION
2510 Decatur Avenue
Fort Worth, Texas 76106

WOODINGS VERONA TOOL WORKS
Box 126
Verona, Pennsylvania 15147

The REMSA exhibits drew huge crowds of railroaders—the potential buyers.



J. M. Williams, director, presenting a brief case to a registrant at the 84th Annual Conference.

PROCEEDINGS

REGISTRATION totaled 2445 railroaders and 404 ladies.

October 16, 1979

The 1979 Joint Session of the American Railway Bridge and Building Association and the Roadmasters and Maintenance of Way Association was called to order at the World Congress Center, Atlanta, Georgia, Tuesday, October 16, 1979, at 9:00 A.M. Mr. R. E. Frame, Assistant Chief Engineer, Maintenance, L&N, and President of the Roadmasters' Association, presided.

President R. E. Frame: As President of the Roadmasters and Maintenance of Way Association of America, and on behalf of Wally Sturm, President of the American Railway Bridge & Building Association, I declare this 91st Annual Technical Conference of the Roadmasters and Maintenance of Way Association of America, and the 84th Annual Conference of the American Railway Bridge & Building Association, to be open in Joint Session.

It is proper that we pause and ask for Divine guidance and inspiration prior to commencing our meeting. The Reverend C. J. Reaves, Pastor of the North Decatur United Methodist Church, will deliver the Invocation. Reverend Reaves:

Rev. C. J. Reaves: Thank you, President Frame.

Out of the writing of the wisdom of the ages, hear these words:

"O Lord, our Lord, how excellent is thy Name in all the earth! Who has set thy glory above the heavens.

"Out of the mouths of babes and sucklings hast thou ordained strength because of thine enemies, that thou mightest still the enemy and the avenger.

"When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou hast ordained; What is man that thou art mindful of him? and the son of man that thou visitest him? For thou hast made him a little lower than the angels, and hast crowned him with glory and honour. Thou madest him to have dominion over the works of thy hands; thou hast put all things under his feet:

"All sheep and oxen, yea, and the beasts of the field; The fowl of the air, and the fish of the sea, and whatsoever passeth through the paths of the seas.

O Lord, our Lord, how excellent is thy name in all the earth!"

In All our ways, our Father, when we have acknowledged thee, thou hast directed our paths.

We invoke thy blessings upon us, thy continued presence upon us this day. We claim your promise that where two or three are gathered in thy name, that you will be in the midst thereof.

We are grateful for your traveling mercies which have made possible our coming from our distant homes and communities with this, a safe journey. Bless our families and our loved ones at home, who pray for us even as we pray for them. Bless be that tie that binds.

We would not enter upon a great nor important undertaking without invoking your aid, our Father. Today's tremendous tasks, today's ultimate decisions could easily overcome us without your help. Therefore, we pray that everyone of us will be able to give our best to the highest we know.

Our love for our neighbor is included in the task we perform to provide this great nation in the world of ours, with all of its citizenry, with the finest of transportation.

We do not take our responsibilities lightly and, so, we pray for an outpouring of your spirit.

Forgive us our trespasses as we forgive those who trespass against us, because our sins do so easily beset us. Bless those in leadership, the President, the leaders of government, those who sit in authority, and those whom this day will be coming to lead and guide, the Presidents of these organizations, and all of those who have a part today, bless them with the power of your spirit.

In the name of the Father, and of the Son, and of this same Holy Spirit, we pray. Amen.

President Frame: Thank you, Reverend Reaves for putting our meeting in the proper perspective this morning. We would be pleased to have you stay for all or any part of the program, but we know you have a busy schedule. Please feel free to leave whenever you desire.

I join with President Sturm in welcoming you to this Joint Session of our two Associations. We sincerely hope that your visit to Atlanta will be rewarding and enjoyable.

The Committees of the two Associations have worked hard in preparing the various presentations and we are confident they will be of real benefit to you and to your railroad.

We also have a very interesting program for the ladies, which includes a tour of Stone Mountain Park today and a shorter tour of North Atlanta homes tomorrow.

I apologize for the late start this morning. We delayed it because the bus schedule did not seem to work out too well. We are hoping that it will get better tomorrow, but, we are not betting on it. We are going to change the starting time tomorrow to nine A.M. We will make a further announcement on that later in the program.

Our registration as of 8:30 this morning was—Roadmasters, 572—B & B, 107—Guests, 721—for a total of 1400 registered.

I will now turn the rostrum over to

Mr. Sturm, President of the Railway Bridge & Building Association.

3 **President Sturm:** Thank you, President Frame. It is a pleasure for me to join with Mr. Frame in welcoming you to Atlanta, and the joint conference of our Associations.

I cordially invite you to attend all the technical sessions of the Conference and to participate in and to view the exhibits presented by REMSA '79.

I would like to present to you some of the members of the Executive Committee of the Bridge & Building Association whose diligent efforts have made this Conference possible. Those whose duties require their presence elsewhere will be introduced tomorrow morning. Will the gentlemen please stand as their names are called and remain standing until all have been introduced? And will you please withhold your applause until all have been introduced?

Beginning at my extreme left:—

4 Mr. J. M. Williams, a Director, Supervisor, Bridges and Buildings, Elgin Joliet & Eastern Railway Company, Gary, Indiana.

5 Mr. O. C. Denz, a Director, Supervisor of Building Maintenance, Milwaukee Road, Chicago, Illinois.

6 Mr. C. M. Russell, a Director, General B. & B. Supervisor, Southern Railway, Greensboro, N.C.

7 Mr. B. J. King, a Director, Bridge Engineer, Coast Lines, Santa Fe, Los Angeles, California.

8 Mr. J. G. Robertson, a Director, Manager of Engineering Design, Bessemer & Lake Erie Railway Company, Greenville, Pa.

9 The next gentleman will be presented later in the program.

10 Mr. J. W. Chambers, Junior Vice President, Bridge Construction Engineer, Missouri Pacific, St. Louis, Mo.

11 Mr. R. C. McMaster, Junior Vice President, Manager, Facilities and Structures, Bessemer & Lake Erie Railway, Greenville, Pennsylvania.

12, 13, 14 The next three gentlemen will also be presented later to you.

15 Mr. D. C. Gould, Assistant Structural Engineer, Senior Vice President, Union Pacific, Omaha, Nebraska.

You may now applaud this dedicated group of gentlemen. (Applause)

I now return the rostrum to President Frame.

President Frame: I want you to meet some of the officers of the Roadmasters Association who have so ably guided the Association this past year. A number of others could not be here at this time because of their duties of attending to the affairs of this Conference. Will each officer stand when his name is called and remain standing until all have been introduced? Please withhold your applause until all are standing.

Hubert Meek, General Roadmaster, 16 D&RGW, Grand Junction, Colorado.

B. H. Price, Senior Development Engineer, B&LE, Greenville, Pennsylvania. 17

Dean Barton, District Engineer, Missouri Pacific, North Little Rock, Arkansas. 18

Ray Hernandez, Track Production Manager, Southern Pacific Transportation Company, San Francisco, California. 19

Hugh Hamilton, Engineer, Maintenance of Way, Algoma Central, Sault Ste. Marie, Canada. 20

Karl Sutherland, Superintendent, Maintenance of Way, Canadian Pacific Railroad, Montreal, Canada. 21

Bill Ferryman, Director of Engineering, Burlington Northern, Denver, Colorado. 22

Ben Sorrels, District Engineer, Santa Fe Railroad, Amarillo, Texas, 2nd Vice President. 23

Don Gale, Engineer of Track, Union Pacific, Salt Lake City, Utah, 1st Vice President. 24

You may now applaud. (Applause)

I will now turn the rostrum back to President Sturm.

President Sturm: We are fortunate this morning to have with us the First Vice President of another Railway Engineering organization. Most of us are also members of the American Railway Engineering Association and many of its Committees are holding meetings concurrently with this Conference. It is

5 with pleasure I present to you Mr. Mike Rougas, Chief Engineer of the Bessemer & Lake Erie Railway and First Vice President of the AREA. Mr. Rougas, would you like to make a few comments?

Mr. Rougas: Mr. Chairman, members of both Associations and guests:

I bring to you greetings from the officers and the Board of Directors of the AREA, along with the wish that you will have a successful conference.

Thank you. (Applause)

President Sturm: Thank you, Mr. Rougas, for your comments. We are happy to have you with us today and hope your busy schedule will allow you to remain for some of our features.

6 I would also like to recognize Lou Cerny, who is the new Executive Director of the Association. Lou, are you out there somewhere? He must have stepped out. Mr. Cerny has taken over now for Earl Hodgkins and the office has moved to Washington, D.C., I understand the Association is proceeding with plans for their convention next March, which I hope you will also be able to attend.

I return the rostrum to President Frame.

President Frame: Another organization whose help is vital to our organization is REMSA, the Railway Engineering Maintenance Suppliers Association. We are indebted to REMSA for their continuing support of our organizations and for the fantastic equipment exhibit now in progress here in Atlanta.

7 It is with pleasure that I call on an old friend of mine, Mr. Bob Crosby, General Manager of Marmon Trans-Motive, and President of REMSA. Mr. Crosby, will you come forward, please?

Mr. Crosby: Thank you, President Frame. It is an honor as President of REMSA to join in welcoming you to this the 91st and 84th Conferences. May I also say this is the 20th year of REMSA as we now know it. I think the longevity of your group is a credit and it is certainly noteworthy that you have survived and prospered as you have and grown through the years. It is with pleasure that I tell you that all members of REMSA join me in welcoming you here to this meeting and we hope you will have a successful meeting, as you usually do.

One of the pleasures and duties of this office is to present to Mr. Frame the REMSA pin, which, however, gets smaller each year, which says:

"President, Roadmasters and Maintenance of Way Association of America." Mr. Frame.

President Frame: Thank you very much.

Mr. Crosby: Also, to Mr. Sturm, which says: "President, American Bridge & Building Association." Here you are, sir.

Mr. Sturm: It has been my pleasure to work with you over the years.

Mr. Crosby: We hope you will enjoy your stay here in Atlanta. The exhibit is for your benefit. Part of it is being held here in the building, as most of you know. Anything the members of REMSA can do to make your visit more pleasant, please let us know. Shuttle buses run to and from this building to the Southern Industry Yards, where you can see the track work machinery on display. We hope you will take advantage of that.

We also want to remind you of the fact of a reception and banquet tomorrow night. You will hear more about that in a few moments.

Again, it is a pleasure, gentlemen. Welcome. (Applause)

President Frame: Thank you very much, Mr. Crosby.

Another old friend of mine, Mr. Owen Buscho, is First Vice President of REMSA. Mr. Buscho, will you come forward with a few remarks? 8

Mr. Buscho: President Frame, President Sturm, ladies and gentlemen:

"Southern Hospitality" is the theme of the REMSA Annual Banquet in the Regency Ballroom on Wednesday Evening, October 17th. The doors will be open at 6:30 P.M. A musical trio will meet you at the door and the trio will be followed by dinner and a fast paced program.

We sincerely hope this affair can be concluded in time to permit all of you to spend some additional time Wednesday evening visiting with your friends and my associates.

Benny Sharp, an old friend from Chicago and an old friend of the railroads, will be on hand. He is a fixture at this annual event. He will again be in charge of the entertainment. He will have Wally Blake, a comedian and impressionist as the headliner.

Linda Merrill, who has been featured in many of the top entertainment spots in the East and the Midwest and has appeared with Bob Hope, will present her unique song styling for us.

Also, we have a special treat, the Southern Lawmen, who will entertain you with some real hand-clapping, foot-stomping, Southern and hoe-down music. I am sure that you will enjoy this show. The same ticket arrangement will prevail as it has through the many years that REMSA has had the privilege of being host for this joint meeting. All registered railroad men and their wives will be provided with complimentary tickets. We certainly hope that all of you will be with us tomorrow night. Thank you. (Applause)

President Frame: Thank you, Mr. Buscho. We have always enjoyed the Annual Banquet which has always been a really nice affair. If any of you are attending this banquet for the first time, you are in for a real treat.

Our keynote speaker for this 91st Annual Conference is my No. 1 boss, Richard D. Spence. Mr. Spence is President of the Louisville & Nashville Railroad Company.

Prior to joining the L & N in September of 1978, he was President and Chief Operating Officer and a Director of Consolidated Rail Corporation, Conrail, from October, 1975, to June, 1978.

Before that, he was Vice President of Operations of the Southern Pacific Transportation Company, since October 1, 1969.

Mr. Spence is a "railroad man's railroad man," from the ballast up, having started his rail career with the Southern Pacific as a brakeman in 1946, following his Navy service. He has been primarily an operating department railroader during his entire career.

A native of Tucumcari, New Mexico, Mr. Spence attended the University of Redlands and earned his Bachelor of Science degree at UCLA and attended management programs at Stanford University and MIT.

It has been my privilege to serve with Mr. Spence on both the Southern Pacific and Conrail and now on the L & N.

As I am sure you are aware, he is the sort of railroader who has earned his stripes, being responsible for the movement of trains. Of course, that also means no fairytales can be told to him regarding our problems. You tell it to him like it is and sometimes you take your lumps. But he also gives you a pat on the back when you deserve it.

Ladies and gentlemen, it is my great pleasure and great honor to present to you Richard D. Spence. (Applause)

Keynote Address

By RICHARD D. SPENCE

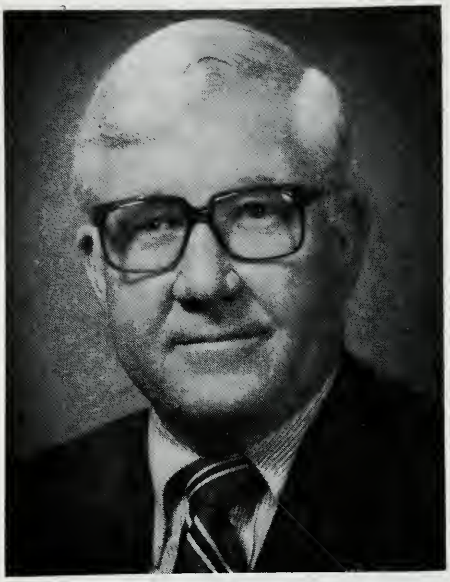
President, Louisville & Nashville, Louisville, Ky.

Thank you, Mr. Frame, I am not sure that I can really respond after that.

It is really a pleasure to be here at Atlanta at this World Congress Center, and it is even more of a pleasure not to be meeting in Chicago after fifty-one years. As a matter of fact, as I listened to some of the introductions I heard someone introduced from Amarillo. I thought that is like being from Tucumcari. It is kind of like being from Chicago. We used to say down at Tucumcari nothing was between Amarillo and the North Pole but a barbed wire fence. So I have to say that you picked an excellent location for your meeting here in your fifty-first year, after meeting in Chicago all that time.

Those of us from the south really know what a problem it is to get through Atlanta. If you fly in and out of here all the time you know how busy the airport is and you are concerned any time you come here. Last night for me really fried it. I was listening, (some of the airlines let you listen in to the pilot and the landing tower), and last night as I was listening in as we landed I heard the control tower clear our flight, saying to the pilot, "302 land on runway 4." Our pilot acknowledged. Immediately after that we heard him clear another flight to take off on the same runway. Our pilot came back and said, "Hey—that is sort of unusual. You just cleared us to land and you just cleared another flight to take off." The tower said, "Yeh—Y'all be careful—you hear!"

Well, Mr. Frame said I am a railroader. I hope I am. I see some fellow railroaders from many years back out there. I just have to say it is a real pleasure to have this opportunity to speak, because I make speeches in many places but it is a real opportunity to talk about railroading to railroaders.



Richard D. Spence

You know, I was particularly pleased to hear from Mr. Frame that I would be speaking here to not one, but to three organizations—the Roadmasters and Maintenance of Way Association, the American Railway Bridge & Building Association, and the Railway Engineering Maintenance Suppliers Association. Until the festivities last night, though, I really did not recognize the significance of the last group, but, Mr. Frame, they really are important to your organization, I must say.

A turnout of a group of people, though, such as this, is so significant because you really are the future of our industry and this does give me a rare opportunity to try to influence the thinking of such a group about that future.

I have to tell you, however, that whenever I do have an opportunity to address a group as large as this one, I am reminded a little bit of Winston Churchill. He heard a lady comment one time after his speech. She said, "Does it not thrill you every time you make a speech to see you are speaking to a very large crowd?"

Churchill said, "Well, it is very flattering but whenever I feel this way, I always remember that if instead of making a political speech, I was being hanged, the crowd would be twice as big."

To get ready for talking with this influential group of railroaders, I consider it appropriate to present not only my own thoughts, but those of Russ Frame, the President of your Roadmasters Association, and also on the L&N is Ace Parker—I saw Ace down here somewhere—and my only hope is they do not squirm on their seats too much on how I have incorporated their ideas into this discussion. They did say they would first like to hear my views on the outlook for the railroad industry before I get down to details about your more specific areas of interest.

Railroad Picture More Optimistic

I will tell you first that I am an incurable optimist about our industry. No matter what our current difficulties are, I do not subscribe to the gloom and doom theory. But because some problems are to be faced, to make a general statement about the outlook for the railroad industry is not easy. Railroads and their various conditions are spread across the spectrum as wide as the horion. At one end, and you heard some of them mentioned, the U.P., and so forth, we have a few railroads that are doing very well, thank you, having no difficulty earning a five percent and six percent rate of return on investment. While this return is inadequate for most businesses today, at least it is a good one currently in our industry.

When these comparatively prosperous railroads need new money for equipment or improvements to plants, they have no problem finding financing, and, at a fairly reasonable cost. At the other end of the spectrum, we have several bankruptcies, and they, like the familiar heroine in the Ancient Perils of Pauline movie, go from one disaster and crisis to another. Financing is all but nonexistent for them.

In the middle, and that is most of us, is the largest number—the forty-one Class I U.S. road haul railroads with annual operating revenues of at least fifty million dollars. These roads are not only solvent but they are making from a little to, in some cases, even a lot of money. The main difference between them and the first group, the relatively well-to-do railroads, is their reception at the bank. The old saying about a banker being glad to lend you money when you do not really need it holds true in their case. Many of them really need it. I will have to say that, unless more certain ways are found to finance our total future, some of this middle group could join that slide towards bankruptcy.

I know how the story goes. I am sure that some of the people in the field, when they see the negative financial reporting, feel that people back in the general office, (and this goes for whatever railroad), think the people might be tickling the figures a little bit. They tell you, "figures do not lie, but liars can figure." Certainly you might get that feeling when you are out on the railroad, walking along your line of road, trying to get some track time to get some rail and tie work done and you are told constantly by the dispatcher, "You have to wait for a certain number of trains to pass before you can do your work." You see train after train pass and you begin to wonder how the general office can put out figures showing a loss or a low net income.

I will tell you what the answer is, partially, anyway. We are like the auto dealer who lost money on every car he sold but made up on volume. We move a lot of trains, but we are not making enough money beyond our cost to provide for the replacement of cars and locomotives, particularly, and rail and ties. If you do not make enough money, to give your employees adequate pay on a small return, you are just like that auto dealer.

Volume, by itself, does not bring profit. In fact, your railroad could be losing money with every extra train it has to run. I am reminded—I talked to Harry Williamson and Mr. Frame here today about one of our mutual friends, Jack Jones. I am sorry Jack Jones is not here because he used to tell me the most significant things that I heard, many years ago. He put it like this. "The rail and the ties do not know whether they are being battered by trains or horse manure or Vat 69."

Faith in Railroad Needed

A great writer once said, "Life without faith is an arid business." I think that is very true, especially in our industry, at this particular point in its history.

I have been outlining our problems of the day. Many of them are not particularly new, but I really do have faith that in time we will be able to surmount them. It is a trite thing to say in railroading but I am going to risk being trite right now. I will say it once more, no other form of transportation is as efficient as the flange wheel on the steel rail. Eventually Americans, and, especially, our elected officials in Washington, must realize the truth of that statement. Our railroad essentially is there, whether they fully realize it yet or not.

De-regulation, at least limited deregulation, just cannot help but come. When it does come, we are going to be able to merchandise our service more effectively.

Leadership Good

Another statement can be challenged. I believe that leadership and statesmanship have developed to full blossom at the uppermost level of the railroad brotherhood. The senior labor union officers, in point today, are perceiving that if they preserve jobs with outmoded equipment, the cost of the help for the railroads may ultimately harm the employment of all concerned. I say that with full knowledge of the events of the very recent past.

Railroad management is often characterized by the media as being inept and incompetent and even uncaring. I have a hunch that even the "super stars" —and I have met some of them—of American business might find it pretty tough sledding with some of our railroads if they had inherited it, given the legacy of the past. I know fairly well a good share of the senior railroad executives across the country and I believe, that, given a reasonable opportunity and some fair game rules, we have the management horsepower—a lot of it is here—to cure what ails us.

The railroad industry does not have to be a modern day Titanic. We are not sinking. We have not hit an iceberg. Our ship is basically sound and our problems are repairable.

I acknowledge that we have the uncertainties of Conrail and the Milwaukee and the deeply serious problems of the Rock Island. I still believe that we can put the railroad industry back on its wheels. We are not yet in such a dangerous position that the only answer to the railroad problem is nationalization. We can, we can together, return our railroad industry to a reasonable level of profitability.

I have just spoken of some reasons to believe we are on the road to recovery. Yet another reason is a number of excellent people (I have seen some of them introduced here today), are still joining our industry. The hope of America is in its youth and it certainly goes double for the railroad industry.

Railroads Not Recruiting Enough Young Men

One problem we face is that we are not recruiting enough young men to particular fields. It has been said for years that any young man who comes to the railroads with real zeal to excel has an absolutely unlimited opportunity. I think with the building and rebuilding job that, we, in the railroad industry have ahead of us, the opportunities are particularly good for the new graduate engineer.

Why have not we recruited well? I think perhaps it has been a matter of better communication with the young people today. Too many of the public equate railroads with the decline in passenger service, over which we no longer have any control. They equate passenger service with the general decline of the railroads. Nothing could be further from the truth.

Another inhibiting factor is that our industry has generally had less than fair and accurate recovery by the news media—(Frank Richards, that excludes you, of course). I could tell you some real horror stories about L & N's own experience. You cannot make them go away. We have to meet that kind of thing head on, get the truth to the young people and let them know that the railroads are a long way from being about to fold up. We need them, because I think these new railroaders will bring to us fresh ideas that will produce advances in productivity, and those advances have to be the underpinning of an upswing in the future of profitability in our railroads.

A Look at Today's Heavier Traffic

Now let us turn from looking to tomorrow and return to the here and now. I am sure you are aware, the L & N is one of the nation's largest coal-hauling railroads. Much of that coal moves today in 100-ton cars and in unit trains. As a matter of fact, our railroad set an L & N record originating 573 unit trains last month, and we expect that record to be broken on a month-to-month basis beginning in October.

Now, you know, as well as I do, that two, three, four or five diesel units followed by 60, 80, 100, 125, 80-ton or 110-ton cars in a unit train are going to produce accelerated wear on your track. I have heard from Russ Frame and Ace Parker, and everybody, who feel that the economics of such wear on our railroad, or anywhere else, really has not been articulated well. That is probably true. Yet I do not think they think the heavier trains need to be stopped or eliminated. As a matter of fact, with the rising need for additional coal tonnage, or whatever tonnage, the fact we are going to haul millions of tons of coal and other bulk commodities, no way exists to stop handling such heavier trains, accelerated wear and tear or not.

These fellows do make a good point with me, and their point is that unfortunately a larger share of the revenue from that traffic should be put back into the track structure carrying the more punishing traffic. In other words, what they tell me is, "Do not hang in there with your old, historical budget after traffic conditions change."

On our railroad, the answer is pretty clearcut and to a point. We just received the go-ahead in August for the finalization of an earlier decision from the Interstate Commerce Commission for an additional twenty-two percent rate increase on coal in Eastern Kentucky. That increase was granted for the specific purpose of enabling L & N to generate a program of buying additional six-axle locomotives and open hopper cars, doing a great deal of additional double tracking, yard rebuilding and modernization, really heavy track reconstruction work, putting in more CTC, and so forth.

In presenting our case to the Commission, we are committed to a five-year $427 million program—and we have to account for the dollars which are spent. So, while we expect a constant increase in heavy trains over a five-year period, we have the opportunity to expect to be ready to efficiently handle this growing traffic load, to put those dollars back where the bang is.

Must Keep Problems in Front of Superiors

Now, you may not be so lucky on

your own road to have this problem and the answer so sharply outlined. Your own problems are not going to be solved if you pass them by, day after day, until you almost forget they are there, and then you excuse yourself because you think you cannot fix all the problems. You establish priorities. You fix this thing first—and then the next thing.

I think one of your prime responsibilities, no matter what the where-with-all, is to keep the problems up in front of your own superiors and to tell them what you think you need. This problem of accelerated wear is here to stay because, as I say, we are not going to stop handling heavy trains. We absolutely need your information to find the answers, too.

Maintenance Officers Must Help With Answers

What further should we do? You will have to help identify the answers.

I would like to hand you maintenance officers a further challenge. Will you help your management to find ways of working more efficiently and effectively? If you will look at your own operations closely and honestly, you will admit that some of your practices date back to the dark ages of railroading. Again, we must have your help on this point. Particularly, with the cost of labor and the increased price of materials, and, they are constantly going up, we have to have increased production per man or feet of rail per man, more ties installed per man.

I know what your answer is, that those figures have been raising over the past years and that you did it with the forces and the resources you had on hand. That is all great. Now, we, together, really have to find a way to do the job better.

I admit and I acknowledge that some companies and some individuals have been quite resourceful in mechanizing elements of maintenance of way work, but still far too many senior maintenance of way officers have either not the imagination nor the determination to commit manpower reduction in return for efficient equipment. What is their response? Their response is, "Now is not the time." It means that they are content to go on "handpeckering" away applying first aid, which disappears about under the eighth train, instead of going to work and curing the problem that is there in the track.

Try to Save Track Time

Everyone needs more track time. Everyone talks about "windows of time." I think that most of the modern day transportation officers have really been busting their tails to give you track time, and they are giving it to you at great cost and impaired operations, and increased transportation costs. I have to ask you here this morning, how well do you use that time?

I feel some relief on our railroad because on the L & N we have been trying to schedule work to concentrate a number of gangs in a given area instead of spreading them out over a large mileage of railroad, say from Corbin to Knoxville on the railroad. In this way, not only do we get more work done, but our dispatchers can move more trains over the road with just one good sized slow order, instead of five or six spread over a 125-mile stretch.

The questions that we are now asking ourselves for the future are, how can we more intensely mechanize, get, in, get out, and let the operating department have their railroad back? Ken Crawford, our Vice-President of Operations, Ace Parker, Russ Frame and I are out on our railroad pretty frequently and it is clear to all of us that we on L & N are still doing many tasks in an inefficient manner. We regularly challenge our own people for an improvement, wherever it is possible, on the L & N, and they have come up with some great ideas. I am certain you do the same for your management.

Need New Ideas

You know, what we need at this

point are some really revolutionary ideas, because the fact is, though refinements are many, you must admit that no real breakthrough improvements in the maintenance of way area have come about since the advent of continuous welded rail and mechanized gangs were developed in the late 1950's.

I am sure you join me in hoping we will see some advance thinking in the equipment area on display here in Atlanta. We really need it.

Tracks Must Be Upgraded With a "Permanent" Fix

The major part of the railroad industry's work effort on maintenance of way is and has been doing a good job. A large portion, perhaps as much as one-half of the L & N budget goes for this, and that is very fine. You have been using this money pretty well. But what in the world is being done with the other half of the M & W budget? I have to say, and this has been said for a long time, we have come to the point where great concentration must be on reconstruction of track, but far too few people are interested in maintenance. Could it be that today's maintenance of way officer does not concept his work properly? Dollars from the M of W budget cover the day-to-day chores, such as inspection, keeping bolts tight, spot-surfacing and all the other maintenance of way details you know about. Yes, these tasks are important, but you have to remember they are just details.

I am reminded of one area on one of my former railroads—and I will not mention it—people constantly used the term, when we went over defective spots, "That's a chronic spot." What they really meant when they said, "That's a chronic spot," was that they had not analyzed the problem. They did not look at what was recurring and they did not devise a permanent fix.

Now, the way to improve a railroad is to get better material, heavier rail, new ties, new ballast, special ballast where you need it, down into that track structure.

I call upon you maintenance of way officers this morning to begin cutting down on spending and re-spending on all these detailed chores and to step up your spending for those track materials and projects that will truly upgrade, not just maintain, your respective properties.

More Pride in Work Needed

Along with the use of good materials, we need to take more pride in our work and demand quality performance from our workers.

I can honestly say we have been doing all we can on the L & N to further the idea that if a job is worth doing, it is worth doing right and it is worth doing right the first time you do it.

Up-grading Different for Different Lines

We use many words and phrases these days which are charged with more meaning than the words and phrases themselves really say. When we refer to Washington, just as an example, we may be talking about the President, the House and the Senate, all at the same time, or we might be talking about the FRA or the ICC, because it certainly means more than just the City of Washington, D.C. So it is with the term "deferred maintenance." People, the news media, talk and write about "deferred maintenance." But what is it, really?

A year ago enough was certainly being said about deferred maintenance in relation to L & N track conditions. But as I have already said many times, in many forms, our track was in better condition than the media would ever have made you believe. To hear some people tell us, deferred maintenance occurs when a railroad does not keep its lines, branch, secondary or otherwise, up to sixty miles per hour or more standard. But you have to admit, as much as you would like it, that would be a misuse of funds, because every bit of our railroad, your railroad, does not need to be gold plated higher iron.

This brings to mind a story. Not long ago, I went over part of the L & N which handles four regular trains a day and a few extras and locals. I had a staff man along, not a maintenance officer, who was very observing. When we arrived back in Louisville from that trip he asked me why the Division Superintendent was so proud of the work that had been done on the railroad because he knew enough to say it had a lot of battered joints and bad drainage, and so forth?

I told him, as you would have, that to appreciate the work and to appreciate why the superintendent was so happy, he would have needed to have ridden the line before, but, moreover, the line was in fine shape for the service asked of it. To have up-graded it further, to the level he apparently expected, would have been a waste of dollars which should have been put into the higher density lines.

At the same time, of course, I acknowledge, as we all know, that lines need to be kept up to their level of need, because, when problems begin to accumulate, they escalate and they become terribly costly. They are far more expensive in the long run than maintenance in the first place.

Conclusion

I have covered much ground and thrown down, I think, a couple of challenges to this group. I would not have done it if I did not think that today's maintenance fraternity is equal to the challenge. I am not sure, really, looking at Ace Parker and Russ Frame, what to expect out of an old brakeman off the SP, who landed in Louisville. I hope what they found was an ex-brakeman who did not mind crunching some of those miles of ballast under foot. I hope they have found that I have lifted their hopes and needs. I hope they will tell you, too, that together we have all worked, worked hard, to solve the problems of the L & N.

It just brings to mind a contact I had with an Engineer down on the Mobile Division the other day. He said he had worked for forty years, and he came really begging for the first job he had. He told the Master Mechanic who hired him, "No shade trees are out on the railroad for me." I told him I had sort of found it that way myself, being a brakeman, working with many people. No shade trees.

And, gentlemen, none are out there for you, either. Just good, hard work for all of us. Then, that wonderful feeling of accomplishment when we tie up at the end of the day.

Thank you for letting me talk a little bit about railroading here this morning. Mr. Frame, thank you very much. (Applause)

President Frame: Thank you, Mr. Spence. You have provided us with an excellent keynote foundation for our meeting this week.

I understand you are going to stay with us for our entire program and are certainly honored to have you do that. Thanks, again.

I will turn the rostrum back to Wally Sturm.

President Sturm: Thank you, Mr. Frame.

Our next presentations will be slide presentations. The members of the Board, if they wish, may go down in the audience where you may get a better view. I will excuse you at this time.

On June 30th of this year, the first segment of the 53-mile MARTA system in Atlanta commenced operation, thus becoming the tenth rapid transit system in the United States.

Our next speaker on this morning's program will address us on this subject and he will be presented to you by Mr. R. C. McMaster, Senior Vice President of the Bridge & Building Association.

Mr. McMaster: Thank you, Mr. Sturm.

Our speaker, James W. Gilland, 12
served in the U. S. Army for 31 years, initially in the Coast Artillery and the Field Artillery, and for 26 years with the Corps of Engineers. His military

career included overseas service in France, Labrador, Hawaii, Vietnam and two tours in Japan. He was in Vietnam during the 1968 TET offensive as a province adviser.

He was involved in the construction of logistics facilities in France, a communications network in Labrador, scientific missile launching facilities on Hudson Bay, and a missile early warning installation in Greenland, as well as the management of the Corps of Engineers work in the Great Lakes and upper Mississippi River regions.

In his final assignment he was Engineer Controller monitoring the Corps' resources in world-wide operations.

He joined the Metropolitan Atlanta Rapid Transit Authority, known as MARTA, in 1975 as Executive Assistant to the Assistant General Manager in charge of design and construction of Atlanta's new rail system.

He has recently been reassigned to work on the system's rail cars as Assistant Program Manager for special projects.

It is my honor to present to you at this time James W. Gilland.

Informal Report on MARTA

By JAMES W. GILLAND

Executive Assistant, Metropolitan Atlanta Rapid Transit Authority
(MARTA), Atlanta, Ga.

James W. Gilland

Thank you, Mr. McMaster.

On behalf of MARTA, its Board Chairman, Daniel B. Patrillo, and its General Manager, Allan F. Kiefer, welcome to Atlanta.

This will not be a formal address as indicated on our program. Rather it is an informal report on the construction and current status of our new system.

MARTA is really an integrated bus and rail system. It serves the City of Atlanta, including DeKalb and Fulton Counties. We hope eventually to serve two additional counties.

While my subject today is principally on our rail system, I would be in error if I failed to mention our high quality bus service. In spite of your little experience this morning with the late buses, we are justifiably proud, I think, of our buses, which are the safest, cleanest and most courteously operated in the country. I know you will have a chance to ride them and I hope you will find my statement is well justified.

I also hope you will have a chance to

ride our new rail system. At the moment, it is relatively short but it is very comfortable and quite reliable, particularly, for a new system.

MARTA was created by an act of the State Legislature to develop and operate the transit system for the Atlanta metropolitan area.

The Authority is governed, if you will call it that by a Board of fourteen members. Eleven of these come from the local constituencies, that is, the City of Atlanta and two counties, and three are ex-officio state officials.

Our income is generated by grants from the federal government for our capital budget, by our fare collections—the fare at the moment is 25¢—and by a 1% sales tax. Now, I know most of you are paying 4% on anything you are buying here but one of those percentages is ours.

Figure 1 shows one of our trains on a distorted view with the State Capital behind it. I will not go into great detail about our organization except to point out that the area with which I am confronted is the Department of Transit System Development.

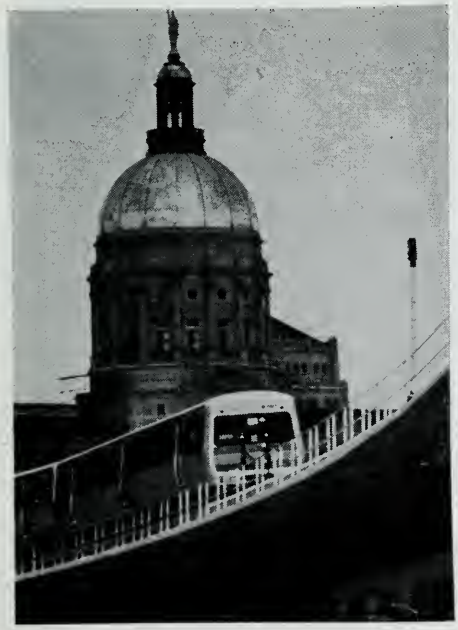


FIGURE 1

MARTA's new transit cars crossing the Interstate. The gold dome of Georgia's State Capitol is in the background.

You would have had a better speaker today in the person of our Assistant General Manager of the Department of Transit System Development, Bill Alexander, except that he is about to retire and his replacement, Bill Barnes, arrived only yesterday from the Chicago Urban Transit District. They are both very fine and capable gentlemen and I am sure that some of you know them.

Our General Engineering Consultant is a joint venture of Parsons, Brinkerhoff, Quait & Douglas, and Tutor Engineering, known to us as PBT. This joint venture is headed by Jim Laney as the Project Director.

These are the functions that PBT performs for MARTA.

Figure 2 is a map of our system. The green is what we have under construction, and the yellow is what we have under design. The combination is what we call Phase "A." The white sections are the ultimate 53 mile system. As you can see, it is a cruciform system with a hub station at five points in downtown Atlanta.

Phase "A" is almost 14 miles under construction, running from east to west. We have a short section on the north line.

We opened our east line into the Georgia State station on the 30th of June this year. In December we will open up our west line out to High Tower Road. In the Spring of '81 we will open up our short north/south line, a space age section only.

In the type of railroad we are building at the moment and, actually, in the ultimate system, 65% will be at grade. We are really not a subway system, although that is how most people refer to us.

The budget for phase "A," is roughly a billion dollars. Again, 80% of this comes from the federal government.

We have had good participation in this project from the utility companies, the railroads, and the local jurisdictions. We have had to move a large number

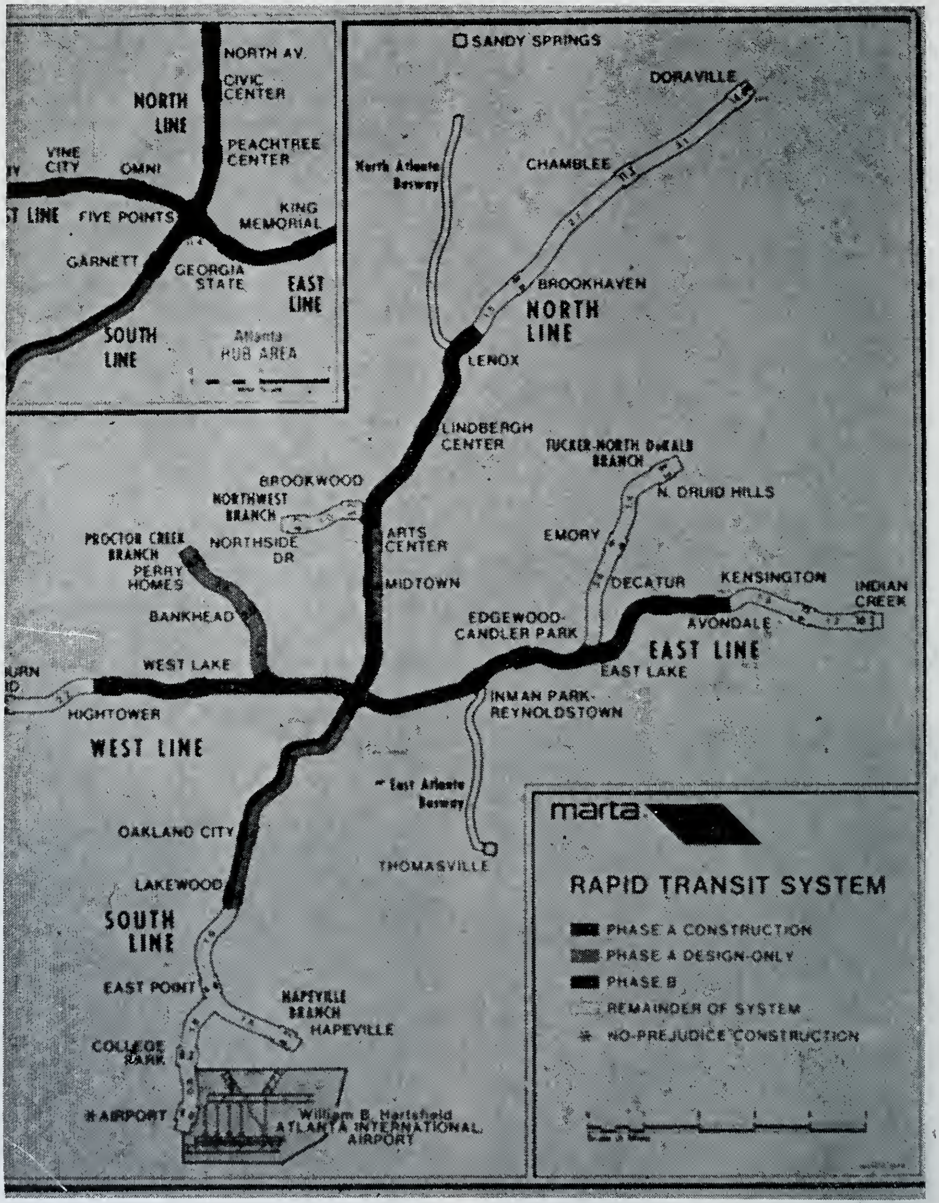


FIGURE 2

Map of the MARTA System showing its phased development.

of streets. Our system follows generally the railroads whenever possible which has caused a great deal of displacement of these railroads and has resulted in a considerable amount of cooperation from them. As you know, Atlanta is a railroad town and we have many railroads with which to deal.

Our East line is fortunately completed so we can run on it.

On the West Line all the contracts are completed excepting four stations, which are only the finishing contracts. Most of our stations in Phase "A" were built in two phases. The basic foundation and shell were built in what we call the first phase and the second phase was the finishing phase. We had a different contractor in some cases, although, generally, the original contractor won the second contract to finish off the architectural mechanical features of the station. Incidentally, our under ground stations are air conditioned. None of the up-grade or aerial stations are.

On our north line practically everything is under way. The exceptions are where we dug a pilot tunnel to research the rock which cut the risk both for us and the contractor in the ultimate project.

The Peachtree Center Station, incidentally, is right under your hotel headquarters, the Peachtree Plaza Hotel.

We have affected employment in the area. We peaked pretty much in '77 and '78.

Our maximum hiring in any one week, the contractors' hiring, I should say, was 2,600, and we have contributed about $40,000,000 a year in payroll to the local area.

Figure 3 is our Avondale Yard. It is at the current eastern terminus of the line. We will extend two stations farther east much later, when we get into our extension phase. Most of this yard is built on fill. A considerable amount of fill to bring this up to an acceptable working level was needed.

We have a maintenance building, car wash, and a yard tower. The Georgia Railroad is along here too.

We have built an aerial structure to carry the lines through the yard and on out to the eventual extension. In this way we will not have to disrupt the yard when we extend further to the east.

We had to build a crossing, which used to be a grade crossing, replacing it with a bridge.

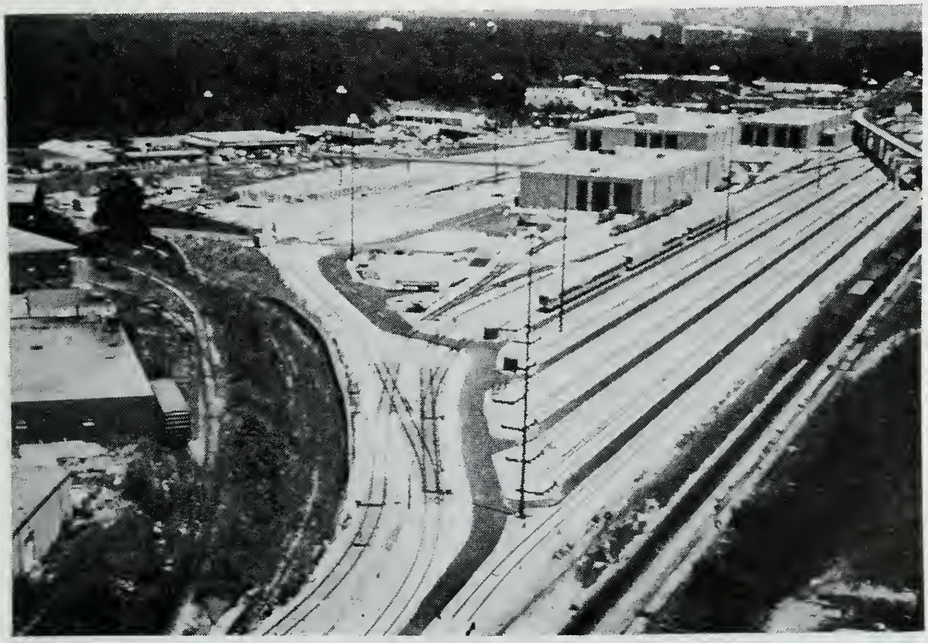


FIGURE 3

The Avandale Yard where transit cars will be stored, serviced, and repaired.

We have a control facility with a radio tower. This terminal station, Avondale Station, is very fancy (Figure 4)

The parking lot has room for 991 cars. As you can see, these parking lots are very full. They are still full even though we started integrated service with the buses feeding into this station just this past week-end.

You may have heard, perhaps, on the news last night that we had some perturbation in this conversion, but basically they were relatively minor and the transition has been relatively smooth.

Incidentally, this is an at-grade station.

The cars are all aluminum cars. They are capable of seventy miles per hour speeds. We are designing to operate on ninety-second headways. The cars will carry sixty-eight passengers each. They travel in married pairs, so that twice that number is possible for seated passengers, and about one hundred standing passengers. Room for a tie-down for one wheel chair is on each car.

We do have, obviously, automatic train control or we would not be able to operate on the ninety-second headway. We have not achieved these yet, by the way, but we are operating now down to about seven and one-half minutes. We are still knocking some of the bugs out but we are safe at those seven and one-half minute headways. So far, the demand has not been so great that we cannot accommodate it.

We have a chopper control system so that any power we generate in coasting or braking can be fed back into the line, provided, of course, that the line is receptive, and can put this power somewhere else.

Coming out of the Avondale Station, the track veers slightly to the north and heads towards the center of the town of Decatur. This is under Sycamore Street. Notice the double box. This is the form here for one side. We have a tunnel here, cut and cover system.

The tracks dive down to go under the tunnel. (Figure 5)

At the Decatur station one of our

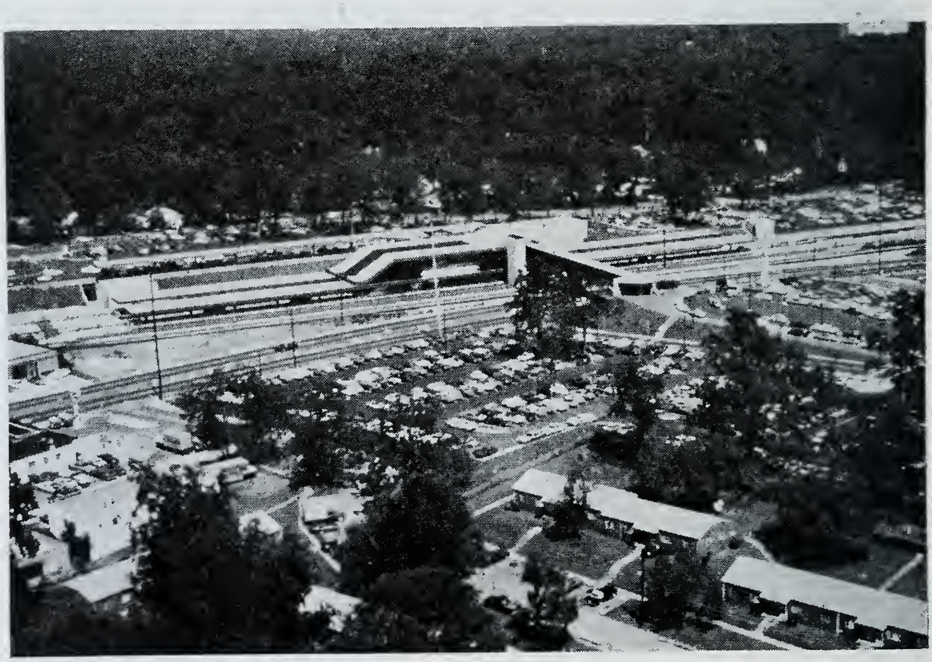


FIGURE 4

The modern Avondale Station has parking facilities for 991 cars.

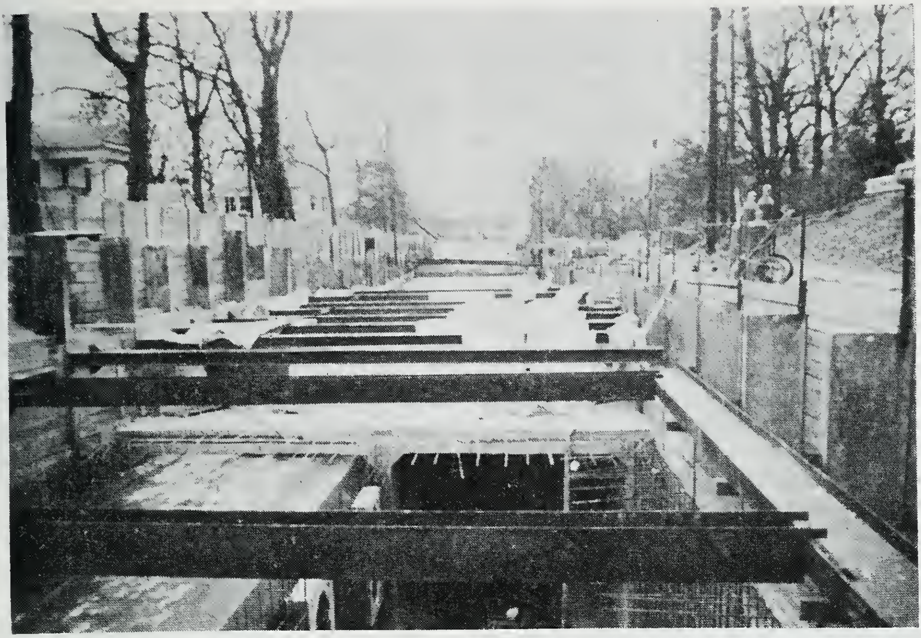


FIGURE 5

Cut-and-cover subway tunnel construction in suburban Decatur.

earliest problems, outside of cutting some unfortunate dogwood trees in this area, was to move the Confederate Memorial. This Memorial obelisk to the memory of those who died in what we call in this region "the war of northern aggression," had to be moved fifteen feet. Some very heated sentiments were expressed about the fact that the fifteen feet was in a northward direction!

The contractor chose to use tie-backs to hold his "soldier pile" walls back. This gave him relatively uninterrupted working space. It was internally braced and they had to work through and around the bracings.

Utility lines had to be kept in service and supported while the work was being done.

The concourse level will have one more level above it and then a plaza on top.

On the upper plaza are stores, an elevator for the handicapped and the street which used to go through here is no longer available for vehicles.

Going now further to the west and going back to the railroad, we come out of under ground and come up to an at-grade station at East Lake.

Going further to the west, the grade separation at Arizona Avenue was our first project and one of our hairiest, or messiest, I guess is a better term. It started in February of 1975. We had a long gap in between that contract in February of 1975 until about December because of a dispute over wage rates under the Davis-Bacon Act. We had to go to court and finally resolved it out of court, but it caused considerable delay in the rest of our work.

This was a complicated project. We had to build a detour road. We had to depress the new street, as well as the feeder street, and put in both a railroad bridge and the one for our system.

Going further to the west is our Edgewood-Chandler Park Station. You will notice that a number of our stations have double names because all the local communities wanted to be recognized.

Chandler Park was on one side of the track and Edgewood was on the other side of the track. Each wanted recognition, so it was a political process to solve this problem by combining the two names. It depends upon which side of the track you come from which name you use.

Another double name has Inland Park on one side and Reynoldstown on the other. All these stations have parking lots, save those in the downtown area of Decatur, and, of course, down in midtown Atlanta.

The King Memorial station is within two blocks of the Ebenezer Baptist Church, which is Dr. King's Church, as you may recall. It is our first aerial station. The trackway is up and the concourse is down. All stations are provided with escalators, as well as elevators for the handicapped.

The King Memorial Station has only one parking lot. A crossing over I-75/85 was difficult because of the narrow median. The two spans of the bridges were pre-fabricated off at the side, transported over and set in place.

We had to stop traffic for a couple of hours on Sunday to accomplish that transition.

In getting ready for the Georgia State Station, our current western Terminus, a warehouse had to be removed and pile bents for a railroad run-around, so we could get into the space.

The demolition of the warehouse was a unique job done with explosives by a subcontractor, Controlled Demolitions, Inc., out of Baltimore. They are quite famous in this area.

The Georgia State station was a very challenging job of coordination with the state. It has a twin office tower for the state government. It is not our project, but, of course, it had to be very closely coordinated. We used the same contractor for the lower regions of the building. Even so, it was a big job in coordination and we suffered considerable delays on it. The station is incorporated in the twin office towers.

This is also an aerial station. Buses serve from the streets.

Those of you who are familiar with railroads in Atlanta will know that the so-called street level in Atlanta, at least in Forsyth-Broad Street area, is one level above the street, because the railroads go through this gulch underneath all these buildings. (Figure 6)

At our 5-point or hub station we built

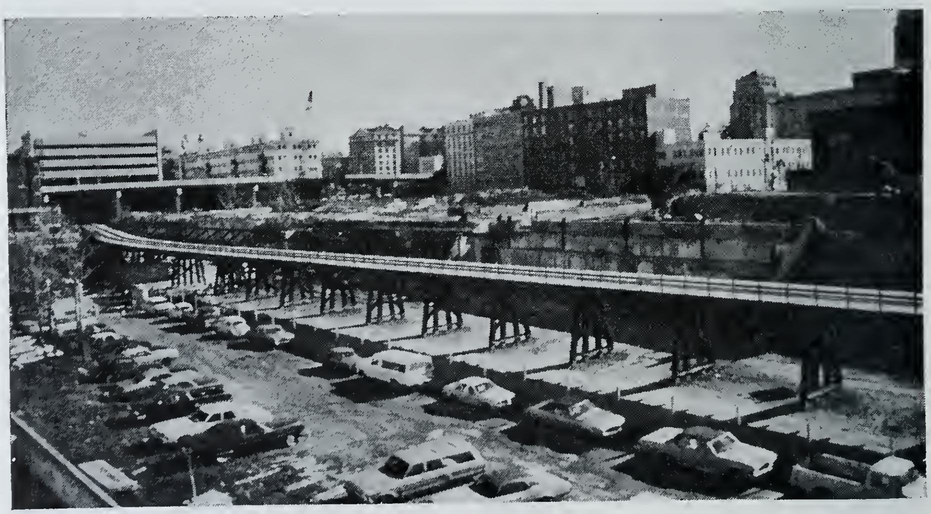


FIGURE 6

A temporary trestle runaround to carry the Georgia Railroad past a station construction site near Underground Atlanta.

the trackways for the east/west lines and then the box had to be filled in and then the street restored.

The 5-point station is a 2-block long station.

As you know, with a cruciform system we have to be able to communicate between the east/west and north/south lines with an interline connector.

Again at Peachtree Street—the bridge over the railroad at Peachtree Street has been broken. Actually, the railroad is still in service under that section of the bridge. We had to take out and block the traffic on Peachtree Street for this construction. The reason we had to demolish a building—and that became a celebrated case, by the way—was because we could not adequately support it. We still had not finished this excavation and we had to remove the building, otherwise we could not have gone down and we could not support the building.

At the 5-point station pre-cast and pre-stressed beams had to be set in place. (Figure 7)

Going from 5-points, we continue to the west towards the OMNI. The OMNI is right next door to the Congress Center. The line comes out and goes underground at this point, under a parking garage. We had a very difficult problem and considerable delay here over real estate. While we owned the surface rights under the parking deck—we did acquire those quite legally and everything—but the owner of the parking decks wants to develop something in there at a later date and he reserved the right for supports. This caused us to considerable delay. He took us to court and we had to settle at a rather expensive fee.

The parking deck foundations are supported on piles, so while it looked a little bit hairy with all the dirt taken out from around them, they are pile supported and the decks themselves are not really in any great danger. We did have to move and replace some of the supports and the contractor came up with some very unusual ways of doing this. Largely with pre-stressing he would

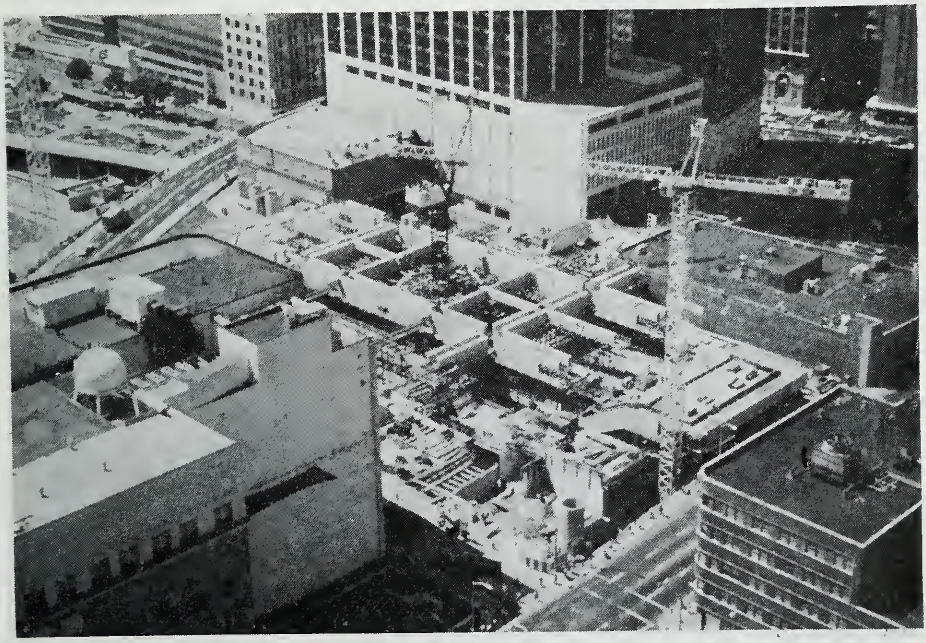


FIGURE 7

The Five Points Station, hub of the system in downtown Atlanta rises above the surface.

take two beams and sandwich them against the piles that he had poured and then pre-stress them so that they arched out and picked up the load. (Figure 8)

The next thing we had to do was go under the Southern Railway. We used a contractor option, a patented method developed in Japan. The railroad is supported by a bulkhead on both sides of the course. They came in and drilled through and drove a pipe through which is arranged in an arch. They are then filled with concrete. Then they excavated out from under that arch, shored it up and put in the ceiling, the permanent portion of the arch, supporting it while the work was being done.

The walls are crash walls to prevent interference between the two railroads.

Going westward we have to get under Northside Drive.

We came up to the Vine City station, a subway station. A very limited parking area is here because we are still fairly close to the downtown area.

On the concourse level of that station are elevators for the handicapped.

Going further west, we had to get by the Morris Brown College football stadium. We had to actually take some of their land in the process for construction—cut and cover.

The Ashby station is an interesting project because it is subway. It is quite deep, and, at this point, we also branched off for our Proctor Creek branch. We put in the branch again now so that we would not have an operational delay later on when we were ready to build that branch.

Our trains, even in this station, because of this transition are at different levels. Incidentally, we do not have any at-grade crossings of our two tracks. We are a two-track railroad and excepting for crossovers for emergency and other use, we do not have any grade connections of our two-rail systems. All the turnouts are grade separated.

The West Lake Station interior is a little bit gaudy for some—but artistic to others.

The contractors did have an option for the aerial structures but most of

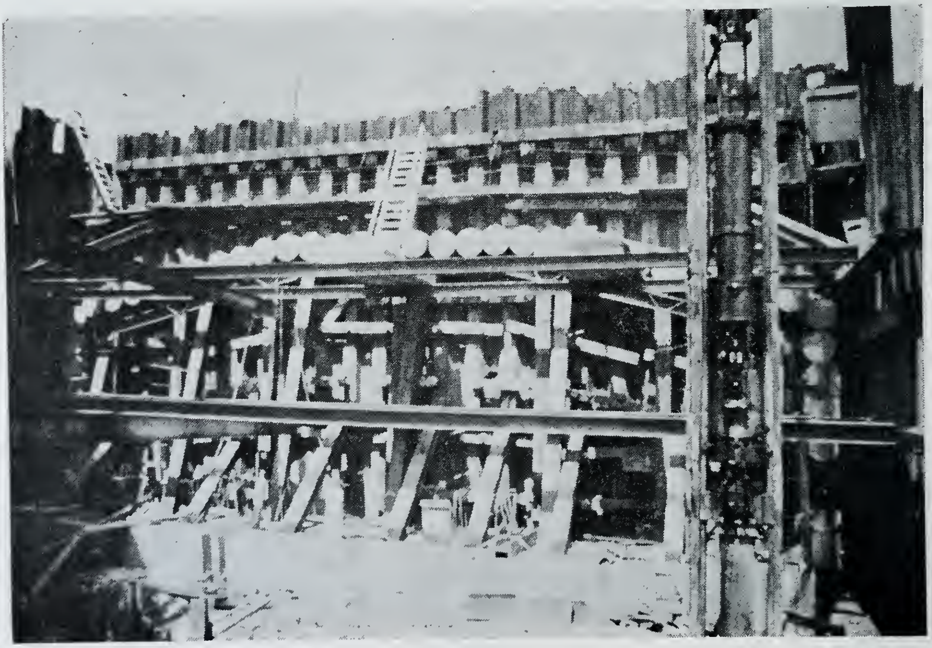


FIGURE 8

A pipe arch supports tunneling under the Southern Railway mainline.

them opted for the steel box girders. They could have used concrete and one did on these lines.

The decking is made of pre-stressed, ten-foot long sections, being placed on a box girder. The tiedowns to the box girders are about 6 bolts.

A guard rail was installed later.

The parking lots at the western terminus will be able to accommodate some 1200 cars. Since the Western terminus will be our terminus for quite some time and many of our passengers are from the west side of the City. This terminus is in close proximity to I-20, so the passengers have good access to the station.

Now in the North/South line, the southern terminus, is the Garnett Station. Peachtree Street—Forsyth Street —and what used to be Broad Street, are here. This is a transition station. Actually, the lines will come out of subway going south as an aerial track.

Further up Broad Street the subway is extra wide because we have to accommodate a third track for the connection of the interline connector, which comes through.

Our tunneling project is hard rock tunneling, not cut and cover. We come at Five-Point, we go through soft ground tunneling, through solid rock, and back out into cut and cover again. We are down about seventy feet at this particular point. Actually, the box is complete and we just started back filling. We drilled down at Ellis Street and Peachtree with a vertical shaft and then mucked out for that pilot tunnel.

Our Ellis Street site is at the corner of Davidson and Peachtree Center. The station is two blocks long, from Ellis roughly down to Harris Street.

Jumbo drills were used and an 8-yard mucker to take out the rock and debris.

In the mining a laser beam was used for control and shields used in getting ready for the soft ground tunneling under air pressure.

Steel sets are used to line the tunnel. It takes seven pieces, although compacted to six inches, it takes seven to make a complete ring.

Two personnel air locks are used getting into the soft ground tunnel.

An old bridge over the Interstate Highway we could not, of course, take out immediately. We started digging up in the area, north of the freeway, getting ready for tunneling and one thing and another, and we knocked out the bridge approaches.

We had to build a bypass.

The south bound traffic was diverted about two weeks so we could knock out the old bridge. Last March, the new bridge was in place and is much longer to allow for an eventual widening of the Interstate.

We do have a problem yet remaining with the traffic here because we have to put concrete panels on the side of the station.

This, incidentally, is the world's only aerial subway station. When we come out of the subway the street will be on top of the station and we will come out of a subway through the bridge and back in the subway on the other side. The freeway will always remain the same.

They are going to make Spring and West Peachtree one-way streets.

Our North Avenue Station is currently the Phase "A" terminus. At this point we veer from under west Peachtree Street and start out from under the block between Peachtree and West Peachtree. Our station is right underneath the new Southern Bell Building plaza.

We are still optimistic, as Mr. Spence said. We are going to build more railroads. We are going to call that Phase "B." That will take us from North Avenue up through Art Center to Lennox. Lennox is a big shopping center and a big hub in the northern near area of the City. We will also go down to Lakewood.

Ultimately we are going right to the airport and we will go north to Doraville.

The North Atlanta and South Atlanta busways will have to be changed but those plans are pretty far down the line. One may never be built as it is a political issue. These are exclusive-use busways for express buses and are a part of the system.

For Phase "B" we need, roughly, we need another six hundred fifty million dollars to build almost six miles north and four miles south, for a total of seven stations, and to buy fifty more cars.

Our new airport terminal will really be unique. It will probably be the only air passenger terminal which incorporates a transit system station. Delta will have most of one side and Eastern most of the other side, with the smaller lines interspersed. The passengers will go down through an underground peoplemover, which is a spine under ground connecting each one of the ramps where the airplanes will come in. These are about one thousand feet apart and they are one thousand feet long.

Much walking will still have to be done even though you get a nice free ride from the terminal out to whichever one of the airplanes you are taking.

Construction is under way. This will be a 2-stage station. In other words, the first stage is the shell, basic structure. We are building that today, so as to preserve our rights for the real estate, and, two, so as not to interrupt passenger service in the terminal.

The terminal is supposed to open up next September. Needless to say, our rail station will not open up because we will not have any rail line connected to it at that time.

And that, ladies and gentlemen, is MARTA as it looks today. I will be glad to entertain any questions. Thank you very much. (Applause)

Mr. McMaster: Thank you, Mr. Gilland. That was a very interesting talk on the problems involved in constructing a new public transportation system. On behalf of the B & B Association and the Roadmasters, I am going to extend to you our thanks.

President Sturm: Thank you, Mr. Gilland.

In these days of gasoline shortages and rising prices, we are happy to see that we have a growing rapid transit system as an alternative and I am sure we all agree you have the beginnings of a very fine modern system.

Our next presentation will be introduced to you by President Frame of the Roadmasters.

President Frame: We are deeply indebted to the Southern Railroad for helping us with many of the details connected with this Technical Conference and Equipment Show. In addition, they have provided us with a film showing Southern Railway track laying, which is intensely interesting and informative.

We are fortunate to have Mr. Hubert L. Rose, Assistant Vice President, Maintenance of Way and Structures, to present the film and make appropriate comments. Mr. Rose.

* * *

Southern Railway's Dual Rail Laying System

By H. L. ROSE

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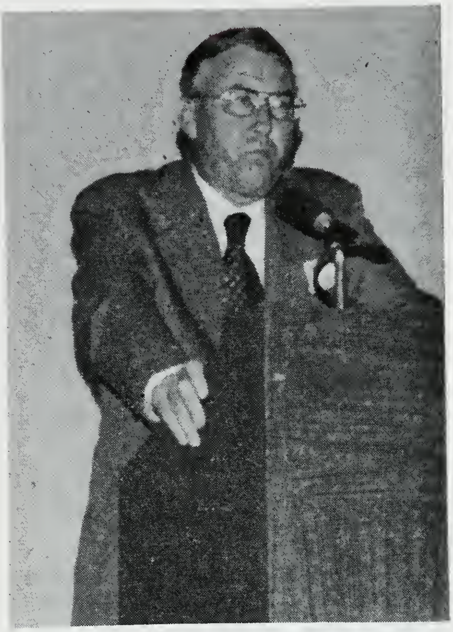
Assistant Vice President M/W & S, Atlanta, Ga.



H. L. Rose

Much current interest is shown in dual rail laying systems. I am sure many of you have been out in the yards to look at the equipment exposition. I notice a dual rail laying system at that location.

The Southern Railway began laying welded rail in 1958 and in 1959 we devised and built a set of rail laying equipment which we used for the dual rail laying system. Over these last 20 years we have laid over 6,000 miles with this system.

We started out with three sets of dual rail laying equipment. Many of those machines have been phased out and replaced with others and we are still looking to replace some of the machines we have in operation right now because they are still labor intensive.

In the year 1978 our transportation people came to us and said, "We will give you the track out there but when you go out there to lay the rail, we want you to lay it at a faster rate and get out of the way."

We took two of those dual rail laying systems and beveled them together to double our production. Of course, as Mr. Spence mentioned earlier this morning, no one ought to ever stand still and we are trying to make some changes now.

We would like to show you the current rail laying system. After you see it, we would welcome any questions.

[Movie]

Mr. Rose: This represents some of our activity in our dual rail laying gangs. That is obsolete now because we are modifying our rail plant in Atlanta.

We have been very fortunate this year on the Southern. We probably laid somewhere in the neighborhood of six hundred thirty miles of welded rail. Out of that six hundred thirty miles, two hundred thirty of it is worn released welded rail. You know, that is the kind of rail that is going to wear out one of these days. If you keep laying welded rail, that is what wears out in the future. We spent about six and one-half million dollars to modify our rail plant. Anybody have any questions?

Member: What about the switches? You did not say how you make your switches.

Mr. Rose: At our Atlanta track assembly plant we have been building panel switches since the middle '50's. We ship out panel switches ahead of the rail laying and lay the welded rail through the switches as the gang progresses. Any other questions?

Member: Is this film available by other lines than the Southern?

Mr. Rose: I did not understand your question.

Member: Is this film available for use by other railroads?

Mr. Rose: Yes, it would be. As I said a minute ago, though, it has already become obsolete. We hope by January or February of next year to be bringing in worn welded rail and reprocessing it here in Atlanta. We have spent a great deal of money out here—we had better get some results. We are going to grade that worn welded rail and reweld it back into one thousand four hundred forty spans to go out on branch lines, yards, or whatever. Somebody else have a question?

Member: Have you welded this rail before?

Mr. Rose: Our current standard has been to weld new one hundred thirty-two-pound rail. The industry yard location here was rebuilt about six or seven years ago and built out of welded ninety-pound rail. Here in the last thirty days we have welded about thirty miles of eighty-five-pound rail. We salvaged it from abandoned lines and we are laying it back on branch lines. (Applause)

President Frame: Thank you, Mr. Rose, for an excellent film. You can certainly be proud of that film.

I will now turn the rostrum back to President Wally Sturm.

President Sturm: Once again I would like to call on Vice President Ray McMaster to present our next speaker.

Mr. McMaster: Our next speaker is David L. McQuaid. Mr. McQuaid is the Senior Welding Engineer with the American Bridge Division of the United States Steel Corporation.

In 1964, Mr. McQuaid was graduated from West Virginia University with a Bachelor of Science degree in Civil Engineering.

Upon graduation, he started his work with the American Bridge Division of the U. S. Steel Company. During this time he had held a number of positions in the Construction Department. These positions included titles of Field Engineer, Project Engineer, District Welding Engineer, and the present title of Senior Welding Engineer.

He had been involved in various field erecting and welding activities on a nationwide basis, including tier buildings, industrial mill buildings, and equipment, bridges, ASME pressure vessels, API storage tanks and nuclear power houses.

Beyond normal erection and welding responsibilities, Mr. McQuaid has assumed the additional duties for heat straightening, stress relieving, primary power distribution for hydrostatic testing, and field machine work.

To further complement his training and career as a welding engineer, Mr. McQuaid has attended welding metallurgy courses and metal workshops.

He is a member of the American Welding Society, a certified weld inspector, and is a Registered Professional Engineer in the State of West Virginia. It is my pleasure to present Mr. McQuaid.

Replacement of Connecting Pin in 520 Foot Deck Truss Span

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By DAVID L. McQUAID

American Bridge Div., U.S. Steel Corp., Ambridge, Pa.

Thanks, Mr. McMaster. It is a pleasure to be here. As I have listened to the Atlanta talk about the politics with which they have to go through as I listened to the railroad industry talk about their political problems in Washington, and as we in the state also have it in U. S. Steel, it reminds me of a statement Will Rogers once made, "Thank God we do not get all the government we pay for."

The speech I am about to give is basically about a replacement of two connecting pins in a five hundred twenty foot truss span. That was for the Bessemer & Lake Erie Railroad bridge, located just up stream from the Pennsylvania Turnpike bridge across the Allegheny River. This is near Exit 5 on the Turnpike, if anyone is familiar with the area, near Harmarville.

The design of the bridge is a continuous three-span deck, truss. It was designed by our Company, American Bridge Division, U. S. Steel, and fabricated and erected also by us during the years 1916 and 1917.

The American Bridge has an Inspection Department and this Department was asked to make a general inspection of the bridge and in particular, the two pin connection areas of the 520-foot span. [Slide 1] We replaced the pin of the bottom chord.

SLIDE 1

What brought about this inspection and subsequent repair was that the Bessemer & Lake Erie said that the pins on the northeast and southwest ends of the span No. seven, and the bottom chord appeared to be moving under live loads.

A closer up view of that pin and chord connection showed heat and burn marks. We had to remove the old paint and remove the nut which was water-stained from the rust and corrosion that was underneath the pin area.

After the inspections were made, the pin nuts were removed for additional inspection and measurement. It was decided by the Bessemer & Lake Erie Railroad Company that the pins would have to be replaced.

These pins were pretty well corroded and damaged and were determined to be beyond repair. That area is a three-eighths inch gap.

Our work consisted of replacing two pins at different piers of the number seven span on diagonally opposite trusses. The location of the pin was on the center span side of the pier connecting the bottom chord of the pier to the panel point. That original pin was eleven and one-half inches in diameter and was approximately thirty-six inches long.

The gusset plate and the bottom chord material result in exactly eight inches of thickness of steel on the side of the pin and eight inches of steel on the other side of the pin, with a gap of thirty-six inches between them. Due to the excessive wear of the pins and of the gusset plates, the pins actually were moving under live loads. That is what brought about the original concern. Somebody was inspecting the bridge and noticed that the pin would actually move when a train load would go over it.

Now, the northeast bottom chord pin was worn even between the pin and the hole. The hole is a three-sixteenth inch oblong in the vertical direction. The southwest corner bottom chord pin was badly corroded under the gusset plates. The pin had a pronounced shoulder on it from where the base metal wear was in the pin itself. It was also very badly corroded under the gusset plates. The pin was approximately three-quarters inch less in diameter than when it was originally made—eleven and one-half-inch size—and the gusset plate under the nut was approximately one-quarter inch less in section due to corrosion. The wear there and on the other pin resulted in approximately a quarter-inch less in cross section.

The pin that was removed from the hole bears some of the wear. A neck on the shoulder on the other side, was not as pronounced as it is on that particular side.

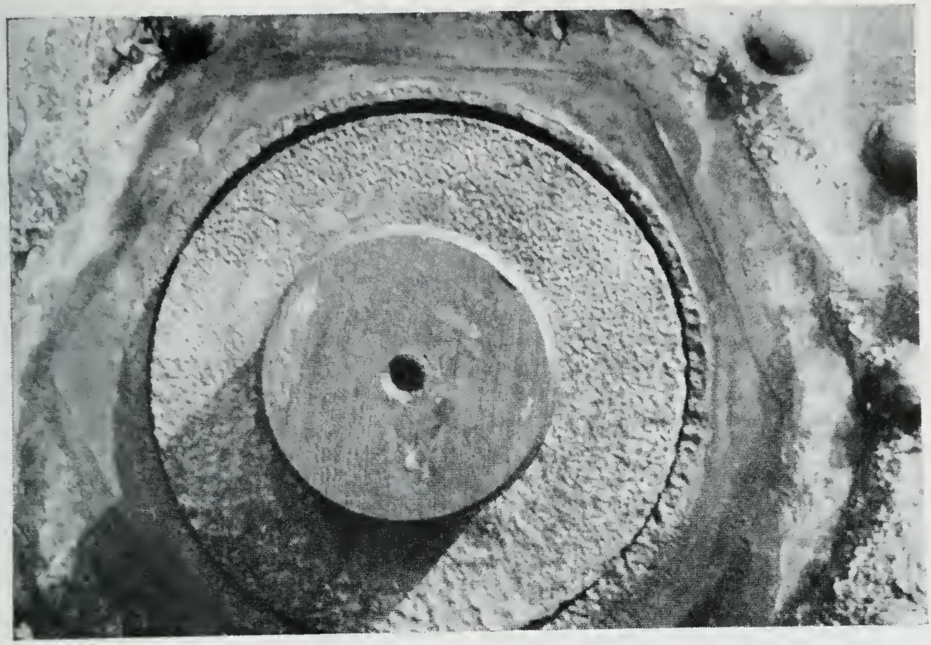
It was determined by engineering and the railroad that, from the wear of the gusset plates and the wear on the pin (which really did not matter because a new one would not be worn) that a twelve and one-half-inch diameter pin would correct the situation.

That would have resulted in a one-half inch of metal having to be removed from all the way around the area. [Slide 2]

From the inside of the pin, the 8-inch thickness, was where the gusset plates would bear on the existing pin.

To accomplish this for the railroad, it required that the old pin be removed and the hole be machined out to a larger size, which was ultimately done. Several plans were considered, but the resultant one was actually to use a boring bar and to enlarge the hole to fit the condition. This required that the old pin be removed and that the hole be machined out to a larger size, twelve and one-half inches in diameter. To accomplish the work, the bottom chord had to be supported for its dead load and a device had to be engineered to carry these stresses. We planned on no railroad traffic. However, we designed the structure so we had a couple of safeguards if things did happen. I will discuss those a little later.

Now, theoretically, the engineers calculated that the stress on this pin would be dead load compression. We found, which was to our advantage, and to the railroad's, a time decrease, but no load



SLIDE 2

on the pin at all, dead load or live load. That is borne out by the fact the pin could actually move. If a load was on the pin, we would not have been able to move it.

The plates were added to the bottom chord to carry this theoretical dead load —and I use the word "theoretical" because there was actually none—but the plates were bolted to the bottom chord and the plates were bearing against the gusset plates of the bridge itself.

Much of our work was done before the actual boring bar took place. Some of the work was done before the actual boring. All we did was to replace some of the rivets, put some fill sections in, and gusset plates. We butted up against the gusset plates.

We still made all attachments so that we would be capable of carrying all the theoretical dead load and live load stresses, if required.

Welding was utilized as a precautionary measure against any possible tension occurring during the pin replacement. In other words, the bracket was to replace the pin and perform the function that the pin did perform. The added plates were capable of carrying the dead load stresses, which they did, whether tension or compression, when the original pin was not in the structure.

No trains were permitted during this pin replacement.

In case something should happen, which would not allow us to complete the work in one continuous operation, we welded an additional bracket alongside the pin with some additional bracing, and so forth, which was our safety measure. If something happened that we were not able to complete the work in one continuous operation in the allotted time given to us by the railroad, we could have placed the bridge back in service. These brackets and that system would carry the train over the bridge under a live load.

We basically just welded the bracket in place. The little, innocent-looking bracket performed a very important function for us. That removed the dead load on the pin itself. I will explain later how that came into service.

I might add that this particular bracket was put on during our down time for the allotted time for replacing the pin, which was a 24-hour period.

Again, that was a precautionary measure. Its only function was to be able to carry the train if we had to stop in the middle of the operation.

Fortunately, we never had to use this backup system, but we did come close during the boring bar operation. Some gaps and notches and some conditions inside the hole resulted in an additional load on the feed rod of the cutter feed system did break the boring bar mechanism we had. We had a back-up boring bar just for such an instance. We took the parts off that were required and then went on with the boring operation. In that particular case we were delayed two hours, which was important time, but it was not something that we were not able to overcome. We sent the original boring bar back to our storehouse and they repaired it while we were in operation and we then had another backup in case we needed it.

A large work platform was built around the pier which extended out under the bottom chord. From the pier to the river below looked to be about eighty feet. The top chord looked as if it were another forty to fifty. This platform was used for all the preliminary work, as well as the actual pin replacement.

This type of work was done before we did start the actual replacement. It had to be. We were on the job approximately four or five months, but not on a continuous basis.

To avoid any undue delay in case the old pin could not be driven out we had on standby a burning bar, which is nothing but a modern day lance, and a bank of oxygen tanks that we could use for lancing the pin out. In this instance, we did not have to lance the pin out. We found it moved under load and it was free to take out without any undue amount of stress, or pressure.

A "U"-bolt was used to take the dead load off the pin. Its primary purpose was to carry the pin so we could bang against it and pull it out. As I said before, the pin removed very easily and was one of the main reasons we were able to cut down on the allotted scheduled time.

The boring bar was set up with the bearing brackets attached to the permanent steel using studs in pre-tapped holes. Again, the brackets were added or put on ahead of time.

Three holes were in the area that we had to drill and tap. We had to pretty well center the boring bar before the fact. You could not put it up there and lay it out and then drill the holes. We had to have an elaborate template system and lay out the holes and come up with the pin on it and lay out the two areas that would be critical for being able to move in, and to bore in one continuous operation.

The boring bar was then inserted into the bearing area. We had attached the brackets and the boring bar in the pre-tapped holes. The bearings were then centered, which at that area had to be centered around the hole, and the cutting head and drive mechanism were attached. Chicago Pneumatic Drill (CP3500, R200) was what we used for power to complete the system. [Slide 3]

The cutting head was designed with three different sockets. Cutting bits were pre-sharpened and were "miced" to the right size and were placed in the head.

The torque created on the boring bar was such that we were not able to use two or three bits at a time. We had to put it down to one cutting bar. The twelve and one-half-inch diameter holes took us to the limit of a hair pass of what we were capable, or, supposed to be capable, with this boring bar. We were able to, instead of using three bits, go down to one, and to make the cut.

Gaps were at the bottom chord of the gusset plate, along the bottom and along the top. The boring bar would make a cut, hit that gap and hit a no-load condition and it would really jar and load

SLIDE 3

the mechanism. This resulted in the damaging of the one boring bar. The gaps caused the cutting bits to dull faster than normal. We had to take extreme care so that the cutting bar would last through the time required to round out the hole to twelve and one-half-inches. As I said, we were concerned about completing the operation in the allotted time and we were very cautious that we were not having a breakdown, or something, that would not let us complete this operation.

If the boring bar was fed too fast it could not be cut or it would be damaged, or, if fed too slowly it would take too long.

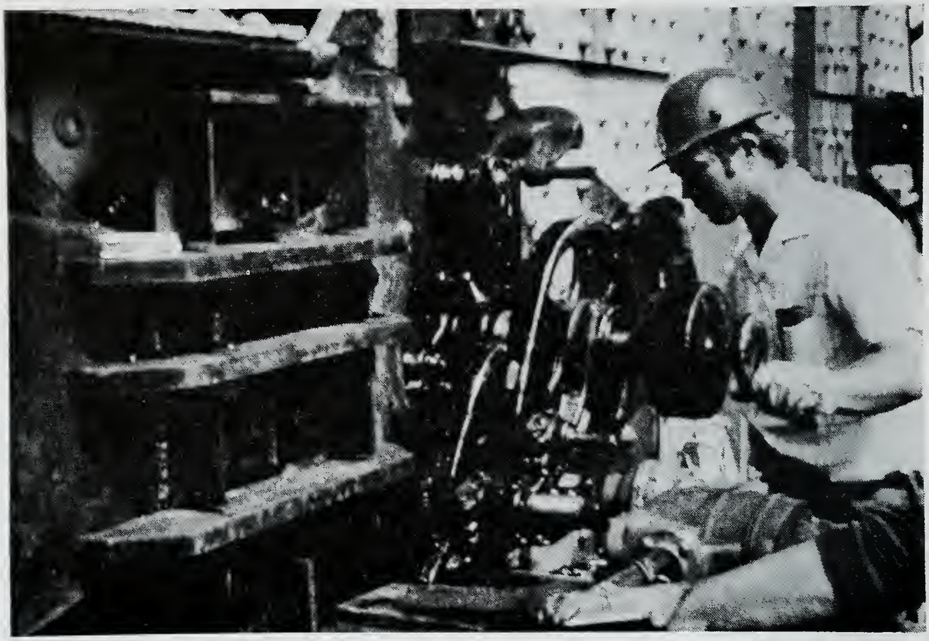
The bits, as I stated before, for our application were pre-sharpened, and prelengthened. The cutting bar was set such that we could take one bit in the first bit holder of the cutting bar and make a slice, and then replace it with the second opening and make a slice, and then put it in the third opening. We had everything pre-arranged. We really did not have to "mic" the hole much, excepting for a check. We did not have to take any time on seeing whether it would fit. We knew ahead of time what would happen if we made this cut and what the size of the hole would be after that cut. We also found out if we reversed the power vane and turned it around, we could make a cut coming back. So we did not have to cut through the hole and then idle it back and then cut back down again. We had planned for eleven cuts, due to the wear in the holes, only eight cuts were required.

We were able to save considerable time through that procedure. It took us a little time to catch on to that one. [Slide 4]

The bottom chord consisted of two webs connected by the pin. Each web, together with one gusset plate, resulted in a thickness of eight inches, so with both webs and both gusset plates, this resulted in a total of sixteen inches to cut for size. It was done by rule of thumb. We pretty well hit this. We found out we could remove approximately one-eighth inch of metal per inch of thickness per hour.

The actual cutting went on continuously with no breaks other than minor adjustments or measuring the hole diameter. After the final cut, the boring bar was removed and we made sure to leave the bearings in place. The hole was cleaned, sanded, filed to remove rough, cutting tool gouges and measured precisely, to make certain the tolerances were sufficient for the new pin. When the hole was determined to be of proper size, the bearings were then removed and gapped and measurements were made. Exact measurements showed that one hole was one sixty-fourth inch over twelve and one-half inches, and the other hole was one-thirty-second inch over twelve and one-half inches. [Slide 5]

The new pin was outfitted with a pilot nut and a driving nut. It was placed in position and driven with a ram of solid steel, eight inches by eight inches by forty-eight inches. The pin nuts were added and the job was completed.



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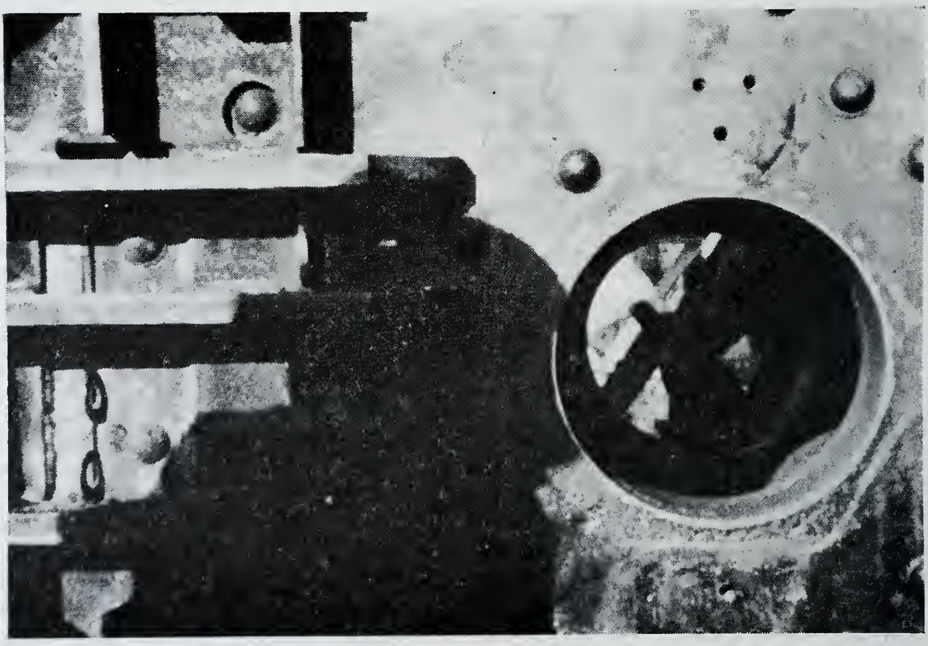


SLIDE 5

We did this in two operations. We did one chord one day and another chord a week later. [Slide 6]

Now, the railroad had allotted us twenty-four hours for each pin. On June 29th, the actual down time was nineteen and one-half hours. On July 6th the down time was fifteen hours. We became a little smarter as we went along, and that decreased the amount of time.

During these two days we had a labor force of 14 men, which included all supervisory personnel. Basically, the equipment used was one large flat-bed truck, one pickup truck, one diesel-electric generator, one electric compressor, two electric welding machines, one Pettibone crane (which was quite handy, because that was the way we rode up and down instead of climbing a ladder) two boring bars (one spare)—miscellaneous burning equipment, a large collection of hand tools, and, of course, the union requirements that whenever you work over water, a boat below.

The railroad inspector's report for June 29th is as follows. And I thank Mr. McMaster for these.

Northeast corner—520 foot span—No. 7–Pier 4. Five A.M.–track out of service.

8:50 A.M.–started boring.

Delay–1:30 P.M.–shaft broke on boring mill.

10:50 P.M.–finished boring.

Upstream size of hole–1/64th inch undersize. What he is telling you there, you design and you plan to have the hole 1/32nd inch over. It was only 1/64th. That resulted in us having to take probably a couple of extra hours to get the pin in.

11:30 P.M.–pin in place.

12:10 P.M.–joint broken.

12:40 P.M.–track restored to normal service.

Called at 7:00 P.M. and gave approximate time for track at 12:30.

9:50 P.M.–told to call the crews for 1:00 A.M.

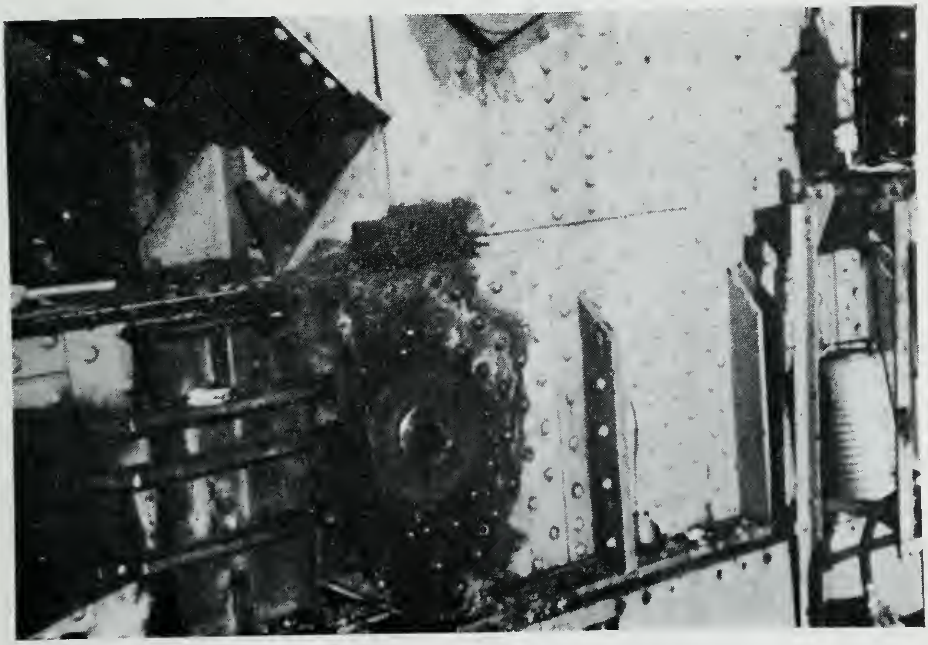
On 7/6/78, southwest corner.

6:10 A.M.–track out of service.

8:10 A.M.–started boring.

6:05 P.M.–finished boring.

6:30 P.M.–pin in place.



SLIDE 6

8:35 P.M.—restored track to normal service.

Called at 4:50 to tell them at 9:00 P.M. the track would be in service.

Called at 6:30 P.M. to tell the crews to report for 9:00 P.M.

I thank you very much for giving us this opportunity. Are there any questions? (Applause)

Mr. McMaster: On behalf of the B & B Association and the Roadmasters, I would like to thank you, Mr. McQuaid, for a very interesting talk.

President Sturm: Thank you, Mr. McQuaid for an excellent presentation.

When the National Railroad Passenger Corporation was formed, it basically inherited the passenger station facilities from the railroad companies. These facilities were not uniform and did not present a recognizable corporate image. Because of this, AMTRAK has developed a series of standard passenger stations.

Our next presentation will be made by Mr. J. N. Michel, Manager of Engineering Design for AMTRAK.

Mr. Michel was graduated from the New Jersey Institute of Technology in 1966 with a degree in Mechanical Engineering.

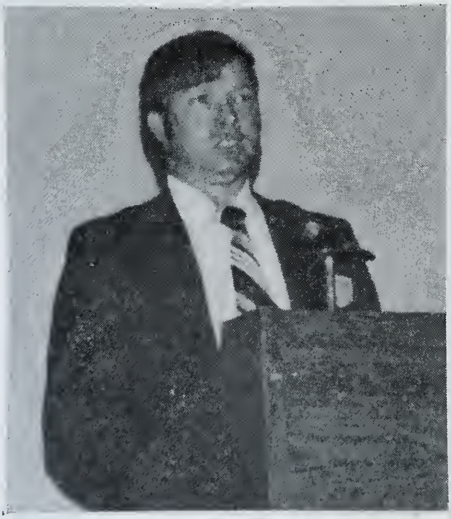
He began his railroad career with AMTRAK in 1975 as Assistant Engineer, advancing to his present position in 1975.

He is a licensed Professional Engineer and a member of numerous professional societies. I am proud to present Mr. James N. Michel.

AMTRAK Standard Depots

By J. N. MICHEL

Manager, Engineering Design, AMTRAK, Washington, D.C.



J. N. Michel

Thank you very much, Mr. Sturm.

As Mr. Sturm mentioned, we inherited many different facilities when we took over the operations on May 1, 1971. Standard stations are not innovations, since railroad companies have had such policies going back to the '40's and '50's. What we have tried to do is pull together a unified system for AMTRAK stations that are easily recognizable and are both cost-efficient and comfortable.

Our operation is very important to the industry, as a whole, because of expense, as Mr. Spence indicated earlier. The passenger stations are what the public sees. We hauled over two million people in June, July and August, and we probably introduced another million or so visitors and family acquaintances who accompany the passengers to our stations. In that regard, what we produce is very important to the industry as a whole. Without further comment, if the projectionist will push the button, we will start the program.

Amtrak's staff of architects and engineers has developed a series of standard railroad stations using common elements of design to effect economies of both construction and maintenance, and to promote a positive and uniform corporate image. Such a stations program is a much needed and important element of Amtrak's on-going task to improve intercity rail passenger service.

Amtrak stations range in size from terminals in major cities of the Northeast such as Washington Union Station, Baltimore Union Station, and New York Penn Station to small, unmanned passenger shelters. Our stations also span a large number of years, ranging from the very old to the very new. Railroads and railroad stations have long played an important part in the development of towns and cities. The central business district of most towns and cities grew around the railroad station. In some instances, the railroad literally created the town as people settled around the station in order to furnish supplies and services to trains. Even in today's age of high speed travel, the railroad station, particularly in small towns, is still a focal point of social activity at train time. A place for good-byes and a place for loving embraces at homecoming.

From 1880 to 1920, at the peak of railroad station construction, the great names of architecture were commissioned to create new gateways of commerce: Washington Union Station, El Paso Union Station, and Kansas City Union Station are a few of the grand stations of this era. These stations were indeed impressive in terms of their size; the great trainsheds of Chicago Grand Central and St. Louis were considered wonders of engineering in their day. Mowbray's Louisville Union Station was completed in 1891, and with its ornate rose windows, was praised as the most elegant station ever constructed. Many towns and cities had notable station buildings constructed by the railroads. Each railroad company would try to gain a marketing advantage by having the most lavish and opulent station building.

With the decline of rail passenger travel after the Second World War, many of these great structures became a burden. In many instances, local governments sought to remove the railroad tracks from downtown in order to ease traffic congestion. Shifts in population and the advent of urban renewal projects caused a number of station relocations. These relocation projects of the 1950's and 1960's resulted in the only significant new passenger railroad station construction.

The Southern Pacific sold the Houston Station property for a new postoffice and constructed a modest pre-cast concrete building which is still used by Amtrak today. The City of New Orleans in 1953 provided the impetus to create the New Orleans Union Passenger Terminal in an effort to consolidate several scattered stations. This station is now operated by Amtrak and functions as an inter-modal facility with Greyhound Bus Lines. In Savannah, Georgia, the Seaboard and Atlantic Coast Line Railroads built a new station to avoid many grade crossings downtown. The Albany, New York Station was relocated to nearby Rensselaer in 1968 to make way for an interstate highway. These new stations, however, are in the minority on Amtrak's extensive system and hundreds of station stops. Most of our stations remain in much the same state they were in prior to Amtrak's creation in 1971. Basic signage has been erected but little else has changed. The stations are still locally known as the Northern Pacific or Santa Fe station where the Amtrak train stops.

On much of our nationwide route structure, Amtrak operates only one train each way daily and, of necessity, the train must pass through some communities in the pre-dawn hours of the morning. In these instances, the railroad station, rather than the train, becomes the primary image Amtrak portrays to the community. It can be a positive image of a modern transportation company as portrayed by the Jacksonville Station, or it can be the stereotype of steam powered trains, as portrayed by the station at McComb, Mississippi. Amtrak is a modern transportation company competing in the transportation marketplace for its segment of the business. Our major competitor is the automobile and the multitude of modern accommodations and travel facilities. Other common carriers have recognized the need for modern terminals if they are to attract the public. Both Trailways and Greyhound have embarked upon a substantial upgrading program for their stations and terminals. The airlines, being a much younger industry, and having a much stronger financial base with local, state and federal airport assistance, have created some very hospitable and functional terminals. In contrast, the vast majority of Amtrak facilities offer the latest in 1920's seating and the bare bulb lighting. They are hardly a competitive outlook to the first time traveler or his greeters.

Early efforts at Amtrak involved the rehabilitation of old railroad cars and the station activity dwelled on much the same approach—up-grading old stations. In many cases new paint was applied to old buildings. But in the three or four years that have passed, it has again become old paint on an old building putting us right back where we started. Since 1971, Amtrak has spent millions of dollars on new locomotives, passenger cars, and turbine powered trains. But our station program has been limited to a few projects with a high return on investment or those instances where new routes dictated the need for new stations. The first Station project undertaken by the corporation in 1972 was a new facility for Cincinnati. The Union Station building built during the 1930's was handling only one train each way daily and the high fixed costs had to be rationalized. Similar situations were instrumental in moving the Jacksonville and Richmond projects to completion. In Richmond, one modern station in the suburbs replaced two old stations in the inner city. The Tri-State Station in Catlettsburg, Kentucky, was a joint project with the Chessie System to eliminate many grade crossings through the heart of Ashland, Kentucky. Other station projects were the result of state subsidized 403b service such as Port Huron, Michigan. Experimental routes operated under Section 403c of the Rail Passenger Act have resulted in new stations in Roanoke, Virginia, Bluefield, West Virginia, Worcester, Mass., and Cleveland, Ohio. One item is evident, the great variation in architectural style presents no uniform corporate image to promote easy recognition of the Amtrak Station. Many national corporations have recognized the importance of facility identity as an effective marketing tool. The gasoline and fast food industries are some of the leaders in this area.

The Amtrak Standard Station Program addresses all of the points discussed. Our objectives are:

1. **To Improve Passenger Comfort:** Amtrak exists to serve the public. Providing comfortable and hospitable surroundings to sell tickets and provide services is, indeed, an effective marketing tool.
2. **To Create a Modern Uniform Image:** We have modern rail passenger cars that are some of the finest in the world, and we are competing against other modes with modern equipment and terminals. We must make it easy for the potential rail passenger to distinguish the Amtrak Station from the stations of the past and from the current stations of the freight railroads.
3. **Our stations must be expandable:** In 1974, a small change in the availability of petroleum derived fuels created substantial changes in rail travel. We have proven in many situations, that people will ride trains when new equipment and frequent service is offered. We

have already expanded Cincinnati, Richmond and Jacksonville due to increased riders or changing operations.

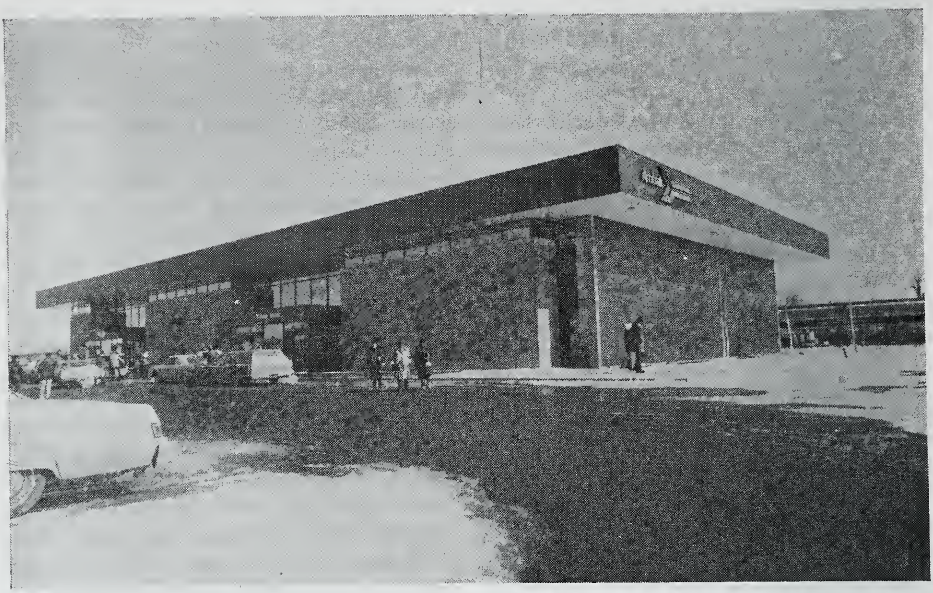
4. **Our stations must be cost effective:** The standardized approach reduces design costs and promotes construction efficiencies through the use of standards details and features. Lifetime maintenance costs are reduced through the use of durable, low maintenance finishes and materials.

The exterior of the standard station designs feature a durable masonry wall panel of precast concrete, brick, or concrete masonry units, a bold fascia band of anodized bronze aluminum, and prominent overhangs. This combination of materials offers a handsome, functional, durable structure offering low lifetime maintenance costs. The interior finishes are equally durable with masonry used for the walls of the waiting area, and quarry tile floors for high traffic areas. The ceiling uses either a 2 x 2 lay-in acoustical tile or a linear aluminum ceiling system. The ticket counter is of a modular design permitting future changes. The ticket counter backwall panels can be changed easily by the agent to accommodate up-to-date graphics that tie in with media advertising. Two seating units with proven history of durability in the transportation industry have been selected for use in our stations. The Amtrak standard station program includes five different sized stations handling from a few passengers to several hundred passengers during the peak hours. Each station is expandable to at least twice its original size.

The Type A station contains 20,000 plus square feet, has four or five ticket positions, self claim baggage carrousel, district and regional Amtrak offices, onboard services space for crews or dining car top-off, train and engine crew locker and toilet facilities. Space can be provided for the Maintenance of Equipment personnel assigned to the station. The end walls consist of an insulated metal sandwich panel that can be removed to provide future expansion. Parking for a minimum of 225 cars is provided. The white areas of the ground floor plan are used for waiting, queuing, and general circulation. The blue area is the ticket sales and counter queuing space. The yellow area is the baggage handling and claim space. The restrooms are shown in red and are designed as a circular kiosk in the middle of the waiting room. To expand either the waiting room or baggage space, the end walls are removed and the building lengthened in 25 foot increments. The area outlined in green is dedicated to onboard services or maintenance of equipment functions. The other administrative functions are contained on the mezzanine. District offices are outlined in green, train and engine crew spaces are shown in blue, restrooms in red, sales staff area is shown in yellow, and public circulation areas are shown in red stripes. The upper area above the waiting room restrooms is a separate lounge space for passengers. This lounge is connected to the mezzanine by a bridge over the entrance, creating a very dramatic effect. Amtrak has two such stations of this design: one in St. Paul, Minnesota and the other in Miami, Florida.

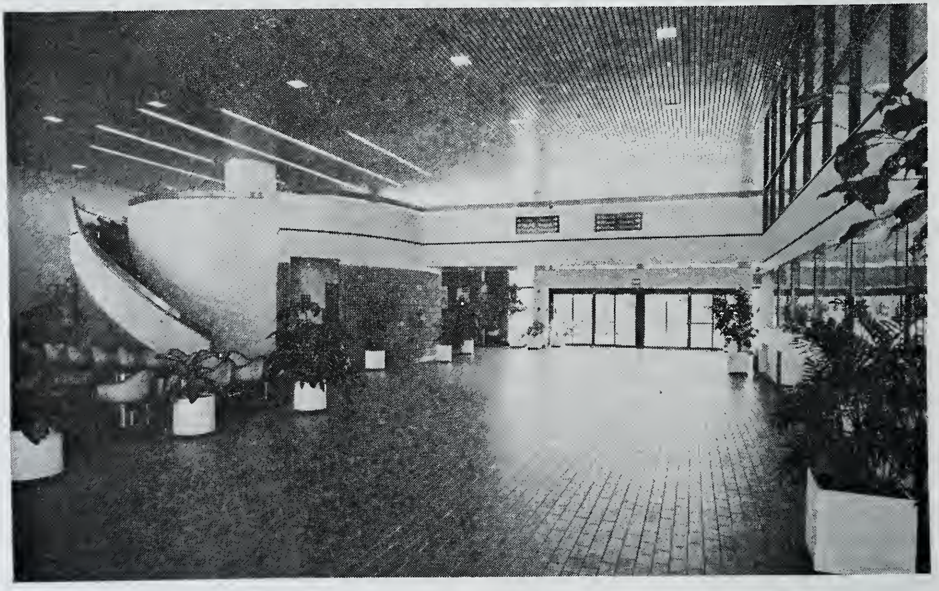
The Type B station has in excess of 8000 square feet of space with three ticket positions, self claim baggage counter, optional train crew facilities, and removable end walls for expansion. Parking for 110 cars is provided. Using the same color key as earlier, the white areas are for waiting and circulation, the blue space is for ticket sales, the yellow area is the baggage space and red for restrooms. Amtrak's Rochester, NY station is the first example of this type building. It is constructed with exterior walls of pre-cast concrete panels.

The Type C station has over 2000 square feet of space with two ticket positions, manual baggage claim by the agent, removable end walls for expansion, and parking for a minimum of 30 cars. The floor plan shows the relationship of the spaces using our same color key, white for waiting area, blue for ticket sales, yellow for baggage, and red



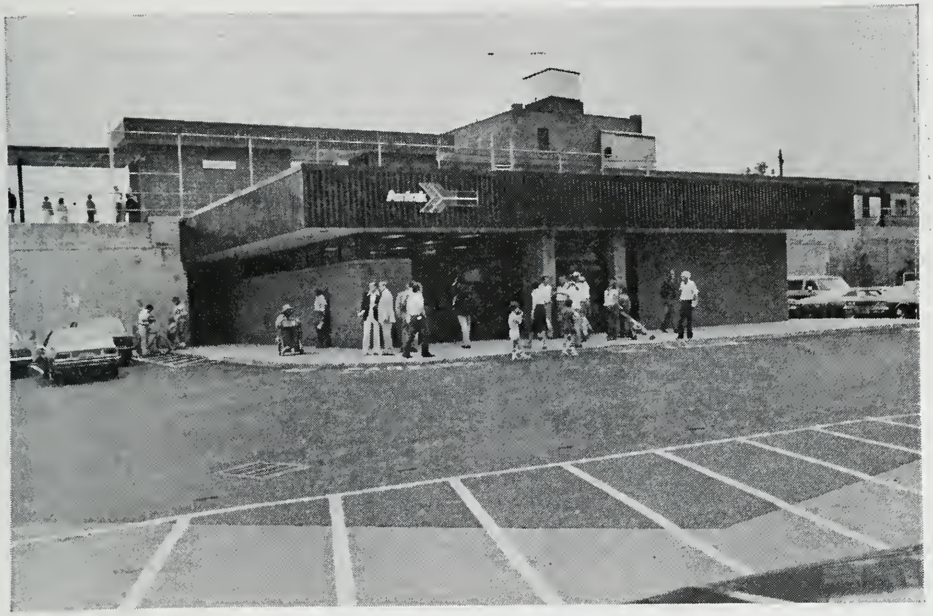
The largest of the Amtrak Standard Stations, designated as a Type A Station, is capable of handling between 300 and 1000 peak hour passengers. Completed in 1978, the Twin Cities Station in St. Paul, Minnesota uses durable masonry wall panels, bronze aluminum architectural metals and a bold fascia panel as its prominent features. The end walls are removable to provide for future expansion.

(Amtrak Photo by M. Kuhn)



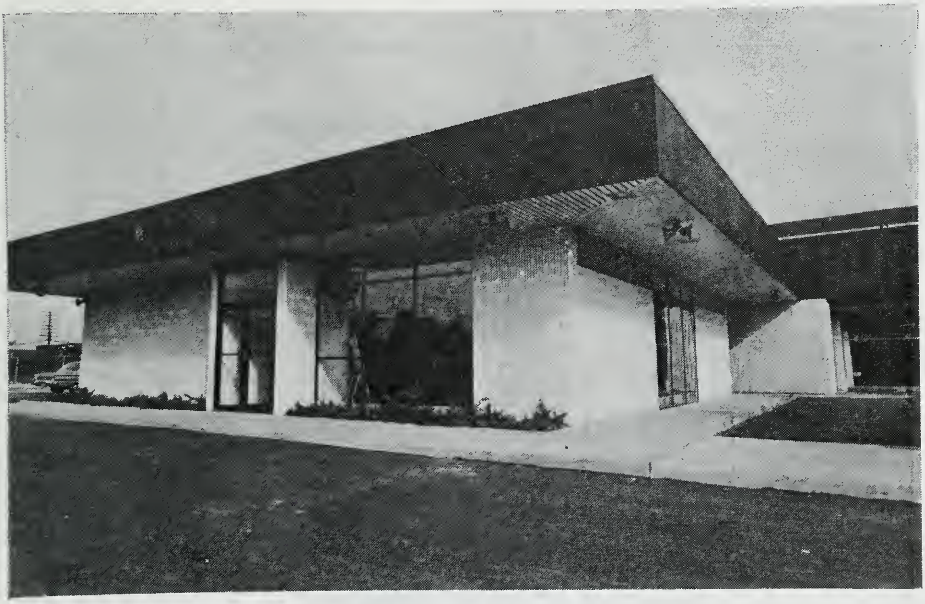
The Type A Amtrak Station features a circular kiosk in the main waiting room to enclose passenger services such as the restrooms, vending machines, telephones, and storage lockers. The interior of the Miami, Florida station has floor and wall finishes that are handsome, durable, functional, and offer low lifetime maintenance costs.

(Amtrak Photo by E. Wojtas)



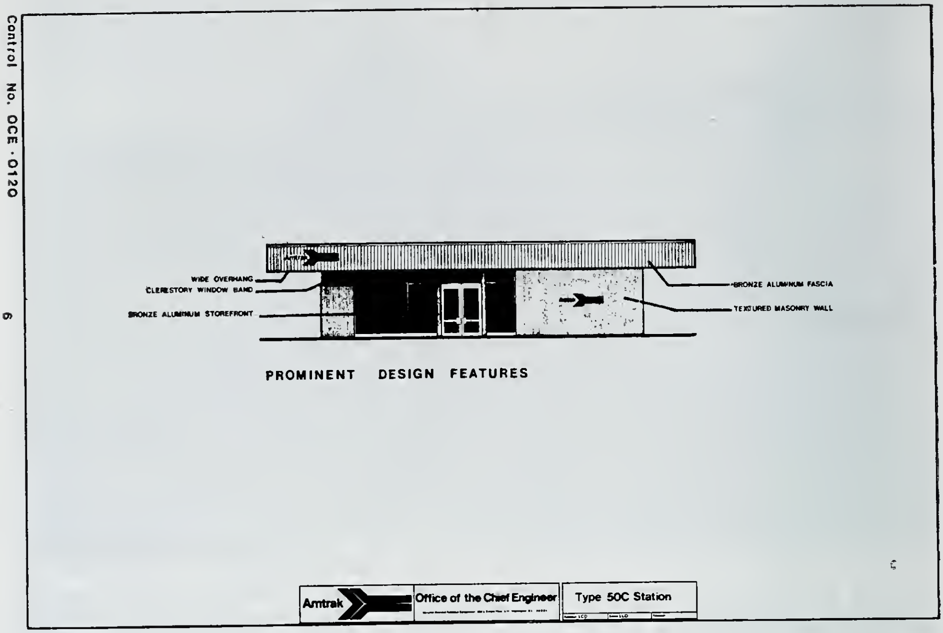
Amtrak's Schenectady, New York station was built to the 50 passenger Type C design. This station, completed in 1979, was site adapted to utilize a former passenger station subway structure as part of the project. The station contains over 2000 sq. ft. and has facilities for the physically handicapped.

(Amtrak Photo by D. Marciniak)

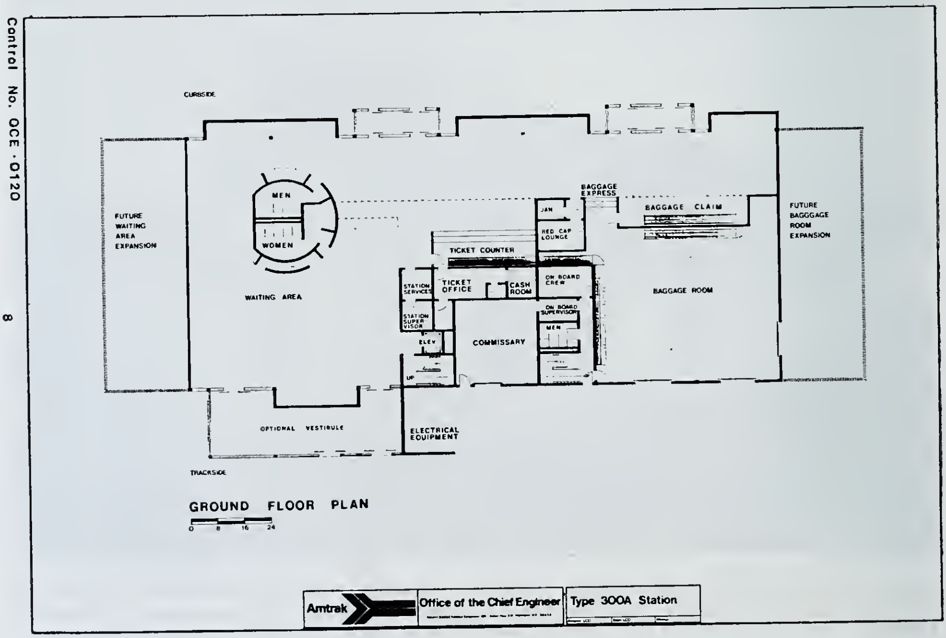


Amtrak's Canton, Ohio, station is a modern masonry and steel structure capable of accommodating 50 persons. Designed to be barrier-free, the station serves the "Broadway Limited," Amtrak's New York/Washington-Chicago train.

(Station Model 50C) (Amtrak Photo)



PROMINENT DESIGN FEATURES



GROUND FLOOR PLAN

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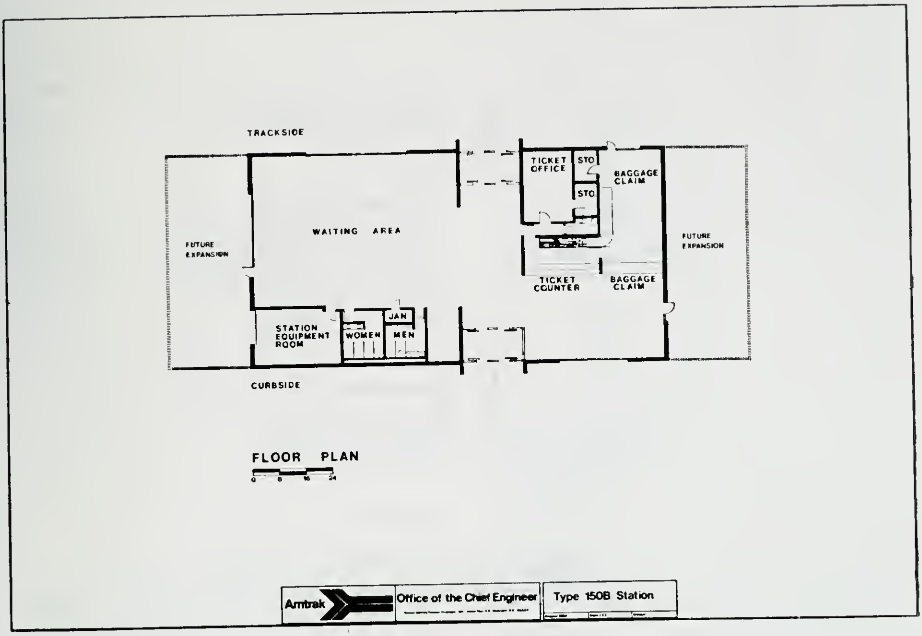

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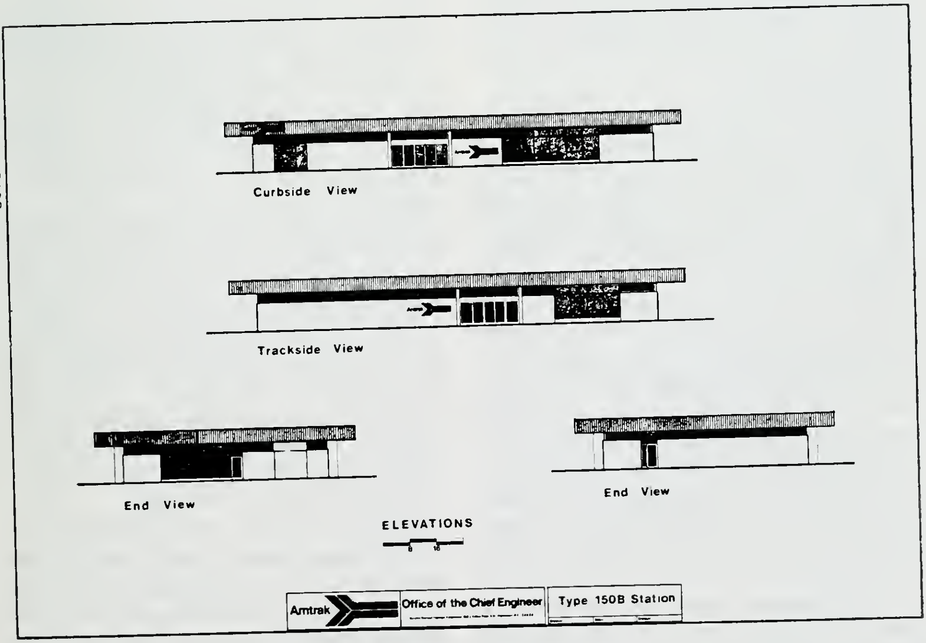
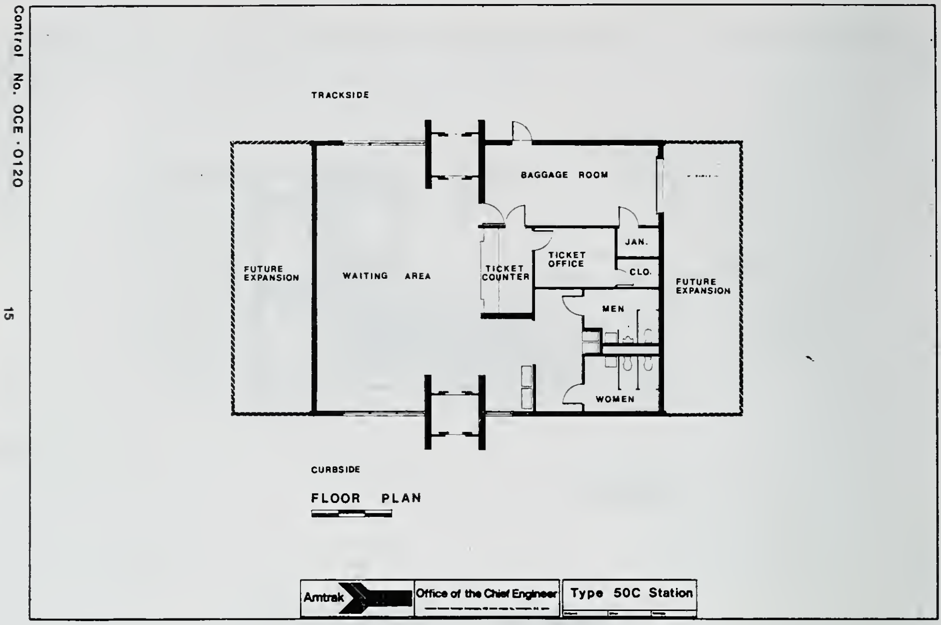




for restrooms. The first Type C stations are located in Canton, Ohio, Dearborn, Michigan, and Schenectady, New York. Several additional sites for this station design have been identified, and are presently being pursued with state and local authorities.

The Type D station has 1000 plus square feet of space with one ticketing position, manual baggage claim by the agent, removable window-wall panel for expansion and parking for 20 cars. The floor plans show the basic and the expanded versions of this simple design.

The Type E station is an unmanned heated shelter where ridership is very low or experimental in nature. The station contains approximately 240 square feet with door locks, lights, and infrared heaters, time-clock controlled to coincide with train time. The station is not expandable and is designed to be disassembled and moved when a larger station is required. Parking for 15 cars is provided.

With adequate levels of capital funding, this program will be the dawning of another era of passenger station construction and over-all rail passenger service improvement. We hope to thus meet the growing needs of the American public for a comfortable, economic and fuel-efficient means of land transportation.

I might mention one very interesting note. A couple of weeks ago, we did not know how big the system was. The system was changing from day to day. I think we have a correct version up there now. We are still not one hundred percent sure.

I would hope that building engineers will recognize the importance of the physical appearance of a passenger station for it helps the industry as a whole. We have high visibility. Sometimes we do not desire such high visibility, but we have it, unfortunately. I hope that each of you in your jobs will try to help Amtrak to improve the image of the industry as a whole by improving your property we share with you.

Thank you very much. (Applause)

President Sturm: Thank you, Mr. Michel, for a very excellent presentation which was very well done. Certainly our whole industry can use a little image improvement.

I will turn the podium over to Mr.

Frame now for any final comments he may have.

Remember, again, we will start tomorrow morning at 9:00 A.M. instead of 8:30, so you can still take the buses over. Thank you.

President Sturm: As of the latest count, the registration includes 692 Roadmasters, 143 B & B, 836 guests, for a total of 1671.

No Roadmaster nor B & B activities are scheduled for this afternoon in order that you may have free time to attend the equipment show, REMSA '79, here in Atlanta, at this World Congress Center and at the outside exhibits.

Does anyone have any questions? Do you have anything to add, Mr. Sturm?

Mr. Sturm: Not at this time.

President Frame: We stand adjourned until 9:00 A.M. tomorrow.

MORNING SESSION

October 17, 1979

The Wednesday Morning Session, October 17, 1979 was called to order at 9 o'clock, President W. C. Sturm of the Bridge & Building Association presiding.

President Sturm: Will someone at the door please tell the people to assemble? We are going to begin the session in about two minutes.

Will the second session of the Conference please come to order?

Our registration as of this morning is Roadmasters, 775—Bridge & Building, 150—Guests, 1149—for a total of 2,080. Three hundred eighty-six ladies are registered.

Ladies and gentlemen, members and guests, on behalf of the Roadmasters and Bridge & Building Associations, I would like to welcome you to the second Joint Session of the Conference.

At this time I would like to present to you some of the members of the Executive Committee of the Bridge & Building Association. Will these gentlemen please stand as their names are called and remain standing until all have been introduced? Please withhold your applause until all have been introduced.

Beginning at my extreme left—Mr. J. M. Williams, a Director, Supervisor, B & B, EJ&E Railway Company, Gary, Indiana.

Mr. J. G. Robertson, a Director, Manager Engineering Design, Bessemer & Lake Erie, Greenville, Pennsylvania.

Mr. J. Budzileni, a Director, Assistant to Bridge Engineer, Rock Island, Chicago, Illinois.

Mr. B. J. King, a Director, Bridge Engineer, Coast Lines, Santa Fe, Los Angeles, California.

Mr. O. C. Denz, a Director, Supervisor of Building Maintenance, Milwaukee Road, Chicago, Illinois.

Mr. C. M. Russell, a Director, General B & B Supervisor, Southern Railway, Greensboro, North Carolina.

Mr. R. C. McMaster, Junior Vice President, Manager of Facilities & Structures, Bessemer & Lake Erie, Greenville, Pa.

Mr. J. W. Chambers, Junior Vice President, Bridge Construction Engineer, Missouri Pacific, St. Louis, Missouri.

Mr. D. C. Gould, Senior Vice President, Assistant Structural Engineer, Union Pacific, Omaha, Nebraska.

The next four gentlemen will be introduced later in the program. You may now applaud these outstanding members of our Executive Committee. (Applause)

I will now turn the rostrum over to President Frame of the Roadmasters.

President Frame: Again, several of our Roadmasters on our Executive Committee are absent taking care of assigned duties pertaining to this Conference. I will introduce those who are present.

Will each officer please stand when your name is called and remain standing until all are introduced? Please withhold applause until all are standing.

Mr. Hubert Meek, General Roadmaster. D & RGW, Grand Junction, Colorado.

Mr. Pat Cosgrove, Systems Engineer, Training, ICG, Champaign, Illinois. He is not here.

Mr. C. D. Barton, District Engineer, Milwaukee, South Little Rock, Arkansas.

Mr. Ray Hernandez, Track Production Engineer, Southern Pacific, San Francisco, California.

Hugh Hamilton, Engineer, Maintenance of Way, Algoma Central, Sault Ste. Marie, Canada.

Karl Sutherland, Supervisor, M/W, Canadian Pacific Rail, Toronto, Canada.

Mr. Max Mitchell, Superintendent of Safety, Maintenance of Way and Structures, Southern Railroad, Atlanta, Georgia.

Mr. H. C. Lewandowski, General Roadmaster, Milwaukee, Chicago, Illinois.

Mr. Ben Sorrels, District Engineer, Santa Fe, Amarillo, Texas, 2nd Vice President.

Mr. Don Gale, Engineer of Track, Union Pacific, Salt Lake City, Utah, 1st Vice President.

You may now applaud. (Applause)

Thank you, Mr. Sturm.

President Sturm: It is an honor to be assigned the pleasant task of introducing the keynote speaker at this session of our Association's eighty-fourth Annual Meeting, and, particularly, when that individual happens to be the President of my own company.

Our speaker, a native of Troy, New York, is a 1940 graduate of the Massachusetts Institute of Technology. His degree from MIT—and this is probably unique among railroad presidents—was in Marine Transportation.

His career in transportation actually commenced a couple of years before graduation when he shipped out on a freighter bound for India, the lowest man in the engine room.

His first relationship in the railroad industry came in 1954, when he served for a year as Assistant to the President of the Bessemer & Lake Erie Railroad.

Prior to, and following, this initial railroad assignment, he was employed in various capacities in the field of industrial transportation.

In 1964 he was elected a Director of the Bessemer & Lake Erie and several associate railroads.

In 1969 he became President of the Carbon County Railway in Utah.

On July 1, 1972, our speaker was elected President of the Elgin, Joliet & Eastern Railway, two other Class 1 railroads, the Bessemer & Lake Erie, and the Duluth Missabe and Iron Range, seven terminal and switching railroads and a dock company. Still another company was added in 1976, when he was elected President of the Birmingham Southern Railroad in Alabama.

While none of the companies he heads is large as compared with the giants of our industry, I think his presentation will help to convince you that good things sometimes come in small packages!

Since 1973 our speaker has served as a Director of the Association of American Railroads in Washington, the Eastern Railroad Association in New York, and the Western Railroad Association in Chicago.

In 1975, he was named to the Board of Trustees of Thiel College, Greenville, Pennsylvania.

He is a member of numerous organizations, including the National Freight Traffic Association and the Traffic Club of Pittsburgh.

I am pleased to present the President of the Elgin, Joliet and Eastern Railway —Mr. M. Spalding Toon. (Applause)

The Railroad Situation Today

By M. SPALDING TOON

President, Elgin, Joliet & Eastern, Pittsburgh, Pa.

M. Spalding Toon

Thank you very much, Mr. Sturm, and good morning, ladies and gentlemen:

I am forever impressed by the extremely high tone of introductions when made by members of my own organization. They always have a very pleasant ring, and appear to be much more flattering than when made by somebody not personally associated with one of our companies. It certainly sounded great! I am sure if I questioned Mr. Sturm in detail, he would agree thoroughly with everything he just said.

I am also impressed by the fact Mr. Sturm has so many of our people on his Board. I am delighted to see they are all here this morning.

It is indeed an honor to once again be the keynote speaker of this session of the Annual Conference of the American Railway Bridge & Building Association, at which we are joined by members of the Roadmasters' Association. Some of you may recall that I previously spoke to you back in 1975, when the late John Ridgeway of our Bessemer & Lake Erie Railroad was your President.

I understand this is the first B & B Convention held in Atlanta in fifty-nine years. I am sure that the railroad officials of that era, were they able to return to this day, would be greatly impressed by the outstanding exhibits of REMSA '79 on display here at the Congress Center and also at the Industry Yards of the Southern Railway System. Participating suppliers are to be congratulated upon making it possible for your members to examine the very latest mechanized railway equipment in one comprehensive exhibit.

Over the eighty-three years that your Association has been meeting, those attending have been privileged to hear addresses by top officers of most of the nation's major railroads. It is a particular pleasure, therefore, for me as President of several smaller roads to be invited to add my name for the second time to this distinguished list. This, of course, is because Wally Sturm of the Elgin, Joliet and Eastern Railway is this year's President of the B & B Association, and tradition dictates that he invite his Corporate President to undertake this most pleasant assignment.

Being with you today also gives me the opportunity to congratulate Mr. Sturm before an audience of his peers and to thank him for the dedication and hard work that have brought him to the post of top leadership in your Association.

As you perhaps noted from his most generous introduction, the several companies I head are medium or small in size, but despite that size, we have always encouraged our people to be active in the various railroad associations. The interchange of information and ideas such as participation provides is helpful to our companies. We also like to think that our representatives make a solid contribution by keeping others up to date on some of the innovative things our roads are doing.

Public Does Not Realize the Importance of the Railway Industry

It is unfortunate that the general public seems to have little real conception of the vital role played by the railway industry and of the many contributions railroads make to the American way of life. The public seems to be completely oblivious of the fact the railroads are the real backbone of the nation's transportation system, hauling, as they do, a large percentage of the country's raw materials, goods and products.

It disturbs me greatly that the absolutely essential role the railroads play is not truly recognized, despite the best efforts of spokesmen for individual railroads, the various railroad associations, our many suppliers and railroad magazine publishers, such as those scheduled on your program for later this morning, knowledgeable men, such as Bob Lewis, Frank Richter and Frank Gray.

In the eyes of the average citizen and, unfortunately, also in the eyes of the many representatives of the news media, railroads are still viewed today only in terms of passenger trains, a phenomenon I call the "Lionel Syndrome." Little or no recognition is given to the railroads' principal role as freight carriers.

Let me give you but one example.

Earlier this year, shortly after the Carter Administration's railroad deregulation bill had been introduced in the Congress, Jack Sullivan, the head of the Federal Railroad Administration, came to Pittsburgh to participate in a meeting sponsored by the Chamber of Commerce. He was interviewed by a panel consisting of a prominent television anchorman, a business editor of one of our newspapers, and a talk show host from one of the major radio stations.

Most of the questions asked Mr. Sullivan by the panel had to do with Amtrak, interspersed now and then with a few caustic questions about derailments and the dangers involved in the movement of hazardous materials. Despite this golden opportunity to learn what deregulation is all about directly from the top official of the FRA, despite Mr. Sullivan's best efforts to direct the discussions into that area, and despite the fact the audience was composed primarily of transportation executives of most of the major Pittsburgh industries —all important shippers, by the way— and many railroad officials, not a single question was asked having to do with railroad deregulation. Potentially, this was the year's most important transportation development.

We toil on in anonymity, unknown, and somewhat unappreciated, except, perhaps, by the shippers who depend upon us for service, the only product the railroads have to sell.

Helping to provide that essential service, of course, are members of your B & B group, one of the most important of the several railroad industry associations.

As you well know, all of you are directly involved in providing safe and efficient facilities in the day-to-day operations of your railroads. Your Association provides an ideal vehicle for the exchange of information and ideas among those who construct and maintain our industry's physical plant. I can assure you that those representatives from our companies who participate are very high in their praises of your activities.

Now, with your indulgence, this morning I would like to use the time I have to give to you a few of my thoughts on the general railroad situation. Then to talk a bit about some matters of possible interest concerning operations of the companies with which I am affiliated.

A Few Thoughts on the General Railroad Situation

Insofar as the railroad industry in general is concerned, I must be classified as a cautious optimist. Sometimes I wonder if I stand alone in this regard when from all sides, we seem to hear only bad news and dire predictions about the bleak future of our industry.

Certainly I recognize that the railroad's share of inter-city freight has dropped from fifty-seven percent in 1950 to around thirty-six percent today. I am painfully aware, too, of the railroad bankruptcies in the Northeast and know full well that the Conrail experiment, even with its highly-publicized second quarter results, is yet to prove successful. Its losses last year averaged more than a million dollars a day. I am certainly well aware of the bankruptcies in the Midwest, followed by the directed service operation of the Rock Island and the impending embargo next month of as much as sixty percent of the Milwaukee's ten thousand-mile system.

Along with you, I shuddered when it was announced, despite setting all-time records in 1978 for freight traffic and revenues, the railroad industry had a return on investment of only one and sixty-two hundredths percent, making it virtually impossible for our capital-intensive industry to raise the cash required to purchase new equipment, to modernize facilities or to provide the long-term maintenance facilities required, such as track rehabilitation or the rebuilding of locomotives and freight cars.

How, then, with all these various serious problems, and, many more that I have not even mentioned, can I possibly be optimistic about the future of the railroad industry?

Well, my optimism is based on several factors, the most important of which I mentioned earlier, and that is that railroad service is absolutely essential to the nation.

Most of you, I am sure, have seen the clever television advertisement sponsored by a major insurance company that stresses the phrase, "He needs me." Well, similarly, the United States needs its railroads. In fact, this country simply cannot get along without its railroads. As late as last month, we noticed how very quickly the President of the United States acted to insure the prompt resumption of railroad service even when it is but a serious **regional** work stoppage. This reflects that without rail service the nation's economy would quickly come to a grinding halt in a short time.

A Devil's Advocate might assert that while the railroads are essential, if they cannot make the grade as private enterprises, they should be nationalized, as they are in most of the other nations of the world. My answer to that is that nationalization is highly unlikely, because it is something taxpayers just cannot afford. Washington is well aware of this, and, in my judgment, it will take whatever action is necessary to make sure that this occurs only as an absolute last resort.

Present Administration Making Effort to Help Railroads

We have already seen firm evidence that Carter Administration has an appreciation of the severity of the railroad problem and seems to be making a sincere effort to help our industry. A first step, of course, was its strong support of the legislation that imposed, for the first time in history, some very nominal waterway user charges. This is a first, but nevertheless a very important effort to provide more even-handed treatment of the various modes of surface transportation.

It is encouraging, too, to see an Administration that finally recognizes that the railroads are severely over-regulated, something leaders in the industry have been complaining about for years. We were the first major industry subjected to federal regulation through the Interstate Commerce Act of 1887, and have been heavily regulated ever since. Railroads are no longer a monopoly and, in my experience at least, the days of the "robber" barons are long gone.

A change is past due and Congress is finally wrestling with the problem of coming up with a deregulation plan that will be not only workable, but also fair and beneficial to both the railroads and to their customers. We in the AAR are working diligently towards that end. While some doubt exists such legislation will be passed in this session, I, personally, am convinced that the Congress is dedicated to finally give us some measure of relief, in the not too distant future, from the very burdensome over-regulation to which this industry has been subjected for almost a century.

Incidentally, the general subject of regulation, or, perhaps, I should say over-regulation, is one of my pet peeves. I am impressed by a recent estimate by the Center for the Study of American Business that the cost of federal regulation of business in 1979 will be almost one hundred three billion dollars. And that is a whopping fifty-five percent increase in just three years from the sixty-six billion dollars in 1976.

While most of you undoubtedly are familiar with the regulations directly affecting our industry, I am sure you realize that railroads are indirectly affected by many other forms of regulation imposed upon industries that ship over our lines.

While everyone would like to see blue skies, sparkling streams and rivers, snail darters and super-safe working conditions, it is well nigh time for the application of a little common sense in attempting to achieve these worthwhile national goals. Proper weight has not been given by the federal government, in my opinion, to the adverse effects upon the nation's economy of the headlong rush for immediate correction of environmental and social problems that have been centuries in the making.

Who can say how many carloads of freight have been lost to the railroads because our shippers have been forced to spend huge sums, which otherwise would have gone to plant expansion for non-productive control devices that provide for the last degree of pollution control? How many tons of coal that should have moved by rail remain in the ground, unmined, because of the new and very costly mine safety rules and the regulations that make it almost impossible for generating plants to burn other than low sulphur coal?

The proposal that an "Economic Impact Statement" be required each time Congress considers enacting a new environmental law has much merit. Incidentally, I was pleased to see the modest step taken in this direction by the White House back in March of '78, when by executive order of the President, all executive agencies were directed to prepare economic impact statements whenever considering issuance of significant regulations. We need to go much beyond this.

Is it not also reasonable to suggest that a modicum of common sense be used in addressing the problem? A classic example is the one of a steel company, which was required to install special scrubbing equipment to reduce the emission of visible iron oxide dust by twenty-one and two-tenths pounds per hour. The scrubber that was installed, however, requires a one thousand horsepower electric motor. In producing the electricity necessary to operate it, the generating plant involved spews out a total of twenty-three pounds per hour of sulphur and nitrogen oxide and other pollutants. So, while the Steel Company is meeting government regulations on visible emissions, the air, overall, is actually one and eight-tenths pounds per hour dirtier because of this governmental regulatory requirement.

This is not an isolated example. More instances in which federal agencies refuse to consider the indirect, but adverse effects of their actions are many.

Energy Emergency Helps Railroad Industry

Let us get back on the track and additional reasons for my optimism about our industry. While it is true that a few railroads are experiencing financial difficulties—and, as you know, seven out of the thirty-seven Class I railroads operated in the red last year—many more are profitable, and have sound prospects for improved earnings in the years ahead. I am pleased that our three Class 1 line haul companies, Bessemer & Lake Erie, Duluth, Missabe & Iron Range, and the Elgin, Joliet & Eastern, are included among those profitable roads, as is our Union Road in the Pittsburgh district, which, incidentally, is the nation's only Class I Switching and Terminal company.

It is somewhat ironical that railroads also stand to benefit from a very serious national emergency, and, I refer, in this case, to the energy crisis. Our industry is in excellent position to, not only, make a major contribution to solving this problem, but, at the same time, should gain a considerable amount of new business. The world's oil shortage, the constant price increases being imposed by the OPEC nations, the slowdown in the nuclear power field as an aftermath of the Three Mile Island incident, and the very cautious approach to the development of solar power, should result in more and more coal being used in the future for the generation of energy. The railroads will haul most of it.

Speaking of energy, the members of your Association are all hard at work on the respective properties in such areas as better insulation, reduction of window areas, reflectorized roof coatings, more efficient heating and cooling equipment, and other projects designed to conserve energy.

Another item in the "silver lining" is the fact that railroads are the most energy-efficient of all the modes of transportation. As compared with our major competitor, the trucks, we consume one-fourth the fuel, produce one-fourth the pollution, consume one-tenth as much land and have substantially fewer accidents.

As the energy crisis intensifies, we can logically look for increased use of rail for traffic now utilizing other modes.

Why Some Railroads Are More Profitable Than Others

I mentioned earlier that our four Class I roads are profitable, and, I am often asked why these relatively small companies enjoy that distinction when other much larger railroads are in trouble. Unfortunately, no magic formula is available. What works for us might not work for others. But, again, with your indulgence, I would like to take a few moments to better acquaint you with the operations of some of our companies.

Geographical Location

First of all, thanks to good route selection by our foresighted founding fathers, the principal railroads with which I am connected enjoy unique geographical characteristics that translate into operating and profit advantages.

The Bessemer, for example, boasts an almost evenly-balanced two-way haul of iron ore and limestone south, and coal north, over its route between the Pittsburgh district and Lake Erie.

The Missabe, on the other hand, is one of the world's principal ore hauling railroads and has been since 1884, when one of its predecessor roads hauled the first iron ore from the Iron Ranges of northeastern Minnesota to Lake Superior.

The Elgin, Joliet & Eastern, as most of you know, connects with every trunk line entering Chicago.

The Union Railroad, although just thirty-one miles in length, serves several of the nation's largest steel mills.

While I would be the first to admit that geographical location, established long ago by others, is important, other factors over which current management exercises control similarly contribute to our success.

Proper Maintenance

We are deeply committed, for example, to the proper maintenance of our tracks and our equipment. Our companies were among the very few railroads reporting no deferred maintenance at all in the Ex Parte 305 proceedings.

Managerial Supervision

Then, too, being small is an advantage in that we are able to provide direct managerial supervision over every element of our operations. Our top officials can, and do, travel to and from any point on any of our railroads in the same working day—not only to check day-to-day operations, but also to lend on-the-spot assistance in solving or forestalling a problem. Such a personal relationship, of course, is just not possible on larger railroads.

One of the principal requirements for a successful railroad operation is to have managers who have time to not only review in detail what is currently going on, but, who also, have time to plan for the future. When your line people are totally involved in putting out fires, they obviously do not have time to devote to proper planning.

My message here is that while I understand the heavy pressures to reduce the number of supervisors to an absolute minimum, I am convinced that the advantages gained by such a policy very often is outweighed by the disadvantages incurred. A railroad must have adequate supervisory personnel if it hopes to have an efficient and profitable operation. Without proper supervision, increased productivity becomes even more elusive.

I am not talking here about being "fat," but given the choice between the two evils, I think you will produce better bottom line results by being, say, a bit "plump," than if your supervisory ranks are too "thin."

Proper Planning

Then, of course, in addition to proper planning in Maintenance of Way and the other individual departments, you must have proper planning at the corporate level.

In our organization, for example, we have a detailed ten-year plan for each of our properties, which is constantly up-dated, covering such important factors as carloadings, total revenues, profit before and after taxes, cost performance, return after investments, long-term debt, cash flow, freight car and locomotive acquisitions, and other important projections which management must have if it hopes to meet the goals of providing good service, holding costs and making a profit.

Standard Cost and Accounting Systems

While not entirely unique within the industry, our railroads are among the few that operate under a Standard Cost and Accounting System for all phases of the business. Every department, every office and every function is covered, with each company being sub-divided into individual cost centers.

In the Maintenance of Way Department, for example, a budget is "earned" for the maintenance of all fixed facilities and performance, that is, cost compared to budget, is measured monthly. A performance that is entirely satisfactory today might not be acceptable for next month or for next year.

Engineered production standards for work procedures are presently attracting attention in the industry. We, however, have been using engineered standards for a good number of years, measuring actual results against standards.

As new equipment comes on line, as better planning ensues, and as productivity increases, the standard time to perform a particular function decreases. This results in improved performance and leads to a tightening of the original standards.

But a word of caution here. Equipment can only increase efficiency if its use is properly planned and scheduled, if the operators are trained and capable and if the equipment is in good condition. So we measure equipment utilization as well, to help insure that proper standards will be met.

Now this year marks the close of the calendar decade during which many changes have occurred in your end of the railroad business. The REMSA exhibits here features equipment and refinements that were not available in 1970.

The computer has come into its own and has become a working tool of the engineers, some of whom are now very capable computer programmers in their own right.

You have solved pollution problems, designed and built more efficient structures, installed electronic scales and ancillary facilities, and are using many new cost-saving maintenance methods.

Innovative and Creative Thinking and Experiments

As we enter the decade of the '80's, however, we face even greater challenges, which are in reality opportunities for increasing over-all efficiency. The importance of innovation and creative thinking cannot be over-emphasized.

Our current scope of testing and research in the railroad industry is unprecedented and will be of even more importance in the 1980's. Next year's budget for AAR's Research and Test Department, to be submitted to member roads next week for approval, proposes a fifteen per cent increase over that for 1979. In addition, considerably more field testing of new materials will continue to be carried out by the railroads themselves. On the Elgin, Joliet and Eastern, for example, we are field testing rubber, concrete, wood, steel and polymer highway-railroad crossings. While we do not have any definitive answers as yet, we are convinced that only through long-range testing will we gain the information necessary to make sound decisions for the future.

As the bridge experts among you know, the decks of concrete ballast deck bridges eventually must be replaced. The typical solution of replacing in kind is not only extremely expensive and time consuming, but also slows transportation operations. We have been using prefabricated glue-laminated wooden panels instead of concrete, which has eliminated extensive form work. The final answers are not yet in, but, so far, these experimental installations look very promising.

In another area, I am sure that many of you have noted the wide publicity given earlier this year to the completion of the Bessemer & Lake Erie's multimillion dollar expansion of its modern coal handling and storage facility at the Port of Conneaut, Ohio, on Lake Erie, where we increased the capacity from nine to thirteen and one-half million tons of coal per year.

Included in the project is a 550-foot long thaw shed to thaw frozen coal during the severe winters experienced in northeastern Ohio.

With the supply of natural gas uncertain and expensive, and with electric rates climbing steadily, we cast around for an alternate source of energy for the new facility, as well as another that serves the original coal operation. We finally decided to go into the wildcatting business, and, we are now in the process of drilling five wells. While we have already struck gas, the project is not yet far enough along to know for certain if the quantity will be sufficient for our purposes. Again, I mention this is just another example of the innovative extremes we go to in attempting to solve our own problems.

Each of you, I am sure, can point with pride to innovations or experiments on your own railroad. Forums such as this, where information on new procedures can be discussed from the speaker's platform and, informally with your associates, are extremely beneficial.

Four years ago at the B & B Convention in Chicago I questioned the necessity of painting entire steel bridge structures. I am pleased to note that painting selective areas of steel bridges are now the practice on some roads. This is a further indication that all of us working together can help one another and our industry as a whole.

The facilities that are your responsibility to maintain are very complex. While no consensus as to the best method or the best materials applicable to the job at hand are available, the alternatives available to you are increasing dramatically each year. It is your job to examine these new options and use innovative thinking, coupled with your own expertise, in arriving at economical solutions to costly problems. Certainly, you will stumble, and, occasionally, fall, but innovative approaches must be tried, and perfected, if members of your Association are to make a maximum contribution to the efficiency and profitability of your respective companies.

Getting back to the properties for which I am responsible, I would be remiss if I did not mention two final and very important factors in their profitability.

Good People in the Organization

First, is the fact we are blessed with a wealth of good people, as typified by your President Wally Sturm. Favorable location, good budgetary and cost-control procedures and modern, well-maintained equipment are all important, of course, but full advantage of them cannot be taken without competent people to oversee their use.

Rewards

And, last but not least, in our case, we reward all but our top men for improved cost-performance and standards tightening by means of a carefully calculated Management Incentive Plans.

I very much appreciate you allowing me time this morning to give some of my thoughts about the railroad industry, and to tell you a little bit about our companies. I am sure that your meeting here, in Atlanta, will be most productive and that you will be returning to your own railroads with a wealth of useful information, as well as a renewed dedication of finding better ways to carry out your most important responsibilities. In that endeavor I certainly wish to you the very best of success. Thank you very much for your time. (Applause)

President Sturm: Thank you, Mr. Toon, for taking time from your busy schedule to present us with an informative and inspiring keynote address. We invite you to stay with us for the remainder of this morning's joint session. However, if your schedule demands, please feel free to leave at any time you wish.

The next speakers on this morning's program will be introduced to you by the Senior Vice President of the B & B Association and our Program Chairman, Mr. D. C. Gould.

Mr. Gould: I have been looking forward to this honor of introducing three gentlemen distinguished in the field of railway journalism. I am sure you will recognize their names and you have read their timely articles dealing with where the railroad industry has come from and to where it might be expected to go.

To address us this morning are Frank E. Gray, Publisher of Modern Railroads, Rail Transit—Robert G. Lewis, President of Simmons-Boardman Publishing Company, Railway Track & Structures—and Mr. Frank Richter, publisher of Progressive Railroading.

It is my pleasure to present Mr. Frank E. Gray, publisher of Modern Railroads, Rail Transit. Mr. Gray.

The Importance In Selecting Personnel

By FRANK GRAY

Publisher, Modern Railroads, Chicago

Thank you, Mr. Gould, and good morning.

I will begin somewhat abruptly by telling you all that you are forty-six years old, and make $27,760 a year.

You have been in railroading for twenty-two years. I draw on this data from our biennial survey, which we published recently.

This morning I want to present a few more statistics, offer some interpretive analysis and editorialize on the significance or impact this represents for you and our industry today and tomorrow.

As a management employee in the Engineering Department, you are the second youngest in your industry, and again at forty-six you are a full year behind the industry average of fifty-seven.

Ninety percent of you own your own homes, as compared to ninety-three percent of the average of forty-seven.

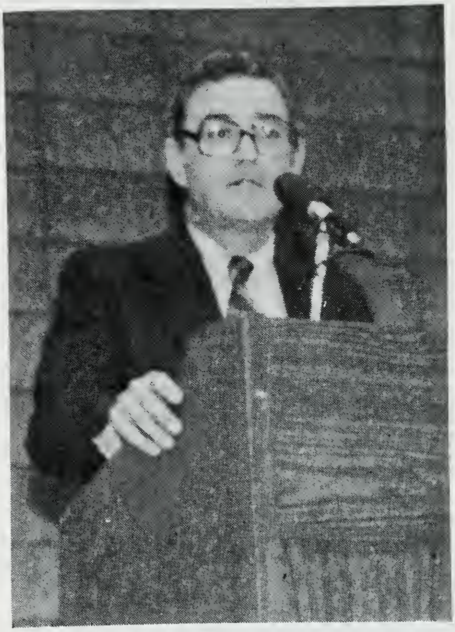
Your income has increased by two thousand dollars comparing '78 over '77, compared with two thousand two hundred dollars for all departments.

Sixty-three percent of you have a college degree, or more.

Let me summarize these points.

You are the second youngest in the industry, the second lowest in average years of service, and the best educated department in our industry.

Let me focus for a moment on the age factor. The preliminary system plan produced by USRA leading to the creation of Conrail contains a reference to age. Published in 1975, it states the average employee age of the six bankrupt railroads to be forty-seven years. The report suggests by 1985, fifty percent of the present employee work force will have been retired.



Frank E. Gray

The U. P. issued a similar message a few years ago, concluding by 1985, fifty percent of their management and labor employees will be gone.

Together, U. P. and Conrail represent twenty-five percent of Class I railroad employees. Projecting these data over Class I employment, during the decade ending in 1985, our industry must replace close to one-quarter million people, or fifty percent of its work force.

I choose to ignore here the questions of what kind of railroad system we will have in 1985, under whose ownership and the level of tonnage we will be transporting. However, I choose to consider these two scenarios of situations in part produced by our failure to address the present. Our industry's ability to grow, its very presence in our society, is the direct function of how we address the importance of personnel selected to run the system.

Difficult to Select Personnel

Are we now with a true sense of priority developing a policy for recruitment and training for a fifty percent replacement of our total work force? With notable exceptions, I suggest not.

One Chief Engineer told me his early and very recent recognition of the situation was when he hired a group of civil engineers and literally told them the first day to start walking track. Within the year he lost his company's total investment. They all quit. While this example may be extreme, the philosophy or attitude that many railroads hold today may not recognize the literal truth to have a future one must first understand the present.

To this day, the Engineering Department has always been the Department having the most highly educated personnel because it took some knowledge of civil engineering to build the railroads in the days 150 years ago when railroading was a bright and new industry. The famous builders of the earliest railroads, Whistler, Allen, Knight and Stevens, were all civil engineers. They presided over engineering feats that were as breath-taking to the Americans of the 19th century, as our man on the moon was to us today. The great early stone arch bridges, horseshoe curves, tunnels and switchbacks of the early mountain railroads, were a fantastic achievement of building without modern earth-moving equipment. The first trans-continental railroad—all these, and more—are part of the proud tradition of railroad civil engineering.

It is fair to say that the 19th century era of railroad building in the United States was also the first great era of civil engineering in this country. Essentially, they are one and the same.

We have inherited a mighty legacy, we members of the Railroad Engineering and Maintenance of Way function. Our role, of course, has been much different in the twentieth century. Our whole interests have had to be on finding ways to keep the tracks maintained at less cost and with fewer people. This is not as glamorous as throwing a new line over the Rockies, but every bit as essential to the well-being of the companies with whom we work. It requires people who are just as dedicated and just as knowledgeable and just as skilled as those who are our predecessors. Perhaps, even more skilled and more dedicated!

Simple tools and simple skills were adequate to maintain the railroads in the early days. The people who maintained them could be persons of relatively limited educational background, but they had to be people who had plenty of muscle and a willingness and ability to work around the clock, often seven days a week, to keep their tracks open.

Today's Requirements Are Different

Today the requirements are much different. Even a lone track-walker may have some type of mechanized equipment to help. Maintenance of way people have to know how to be at home with a wide variety of machinery to be able to maintain a track structure that will carry the heavier loads and at far higher speeds than their forebearers ever imagined.

The track worker and MW officer, from gang foreman to chief engineer, has to be a well-educated person whose skill is not exclusively of the muscle, but of the brain as well.

This brings me to the question of what kind of person the railroad needs for MW work and are they getting those persons? Certainly, many railroads today do have recruitment programs under which they hire young engineers directly from the colleges. This is not new, of course. The Pennsylvania Railroad and others had organized college recruiting programs early in this century. In those days, though, college recruits had to be willing to go through all sorts of hardships to earn their stripes as full members of the railroad team. The apprentice engineer might spend many years on the section gang, or, as a track supervisor, before getting a crack at the exalted position of assistant engineer or assistant position engineer. He could expect to move from one location to another every few months of his career.

Today, if you hire a college graduate and ask him to work under those conditions, he will not be with you very long. For better or for worse, a different work ethic is abroad and young people do not take kindly to long hours, frequent moves and hard physical labor. They want good—some say exorbitant—pay, regular working hours, no week-end work, and a chance to stay in one place long enough to get some roots down, and, really, who can blame them?

I wonder if railroads really understand this new breed, this new work ethic—or, if you prefer, non-work ethic. Judging from some of the young engineers with whom we have talked, and the high turnover of engineering personnel on the railroads, the answer has to be negative or, at least. doubtful. We have been handed, without much explanation, a mighty tradition, a great legacy. We just cannot hand over that tradition to our successors. We have to understand the tradition ourselves. Even more important, we have to understand how that tradition, which has shaped our own careers, has to be changed and molded to fit the changing conditions of todav and the new breed of people who will be taking over the baton.

I lament, to over-simplify, as market conditions change, our industry, frankly, too often, ignores change. It sets itself apart, leaving tradition as an explanation for a logic that never was.

Let us put greater emphasis on prudence. Let us acknowledge that training is of significant importance and its results measurable. That process requires that a civil engineer from Cornell be trained and that he observe and perhaps participate in the operational and management procedures in the mechanical, transportation and other departments. Would it be unseemly to suggest that he or she has at least a smattering of knowledge about the marketing department, to enjoy the reality that a customer exists out there some place, that my enterprise—my enterprise—is serving that necessary function of moving products, benefiting both shipper and consignee. a process our economic existence depends upon.

Is it alien or strange that the newly educated employee in whom you have invested so much has respect for the enterprise, society and culture and a notion of what the business ethic is all about and to assist him or her in addressing and accepting job assignments? I submit that all engineering employees can benefit from the kind of broad training I have been discussing and in turn this will have a positive effect on the ultimate goal—the bottom line profit.

Is Top Management Making The Best Decisions?

I have yet one final message, and it is not based on fact or even adequate or on-going research. Further, the statement is somewhat delicate. It is an extension of a point I made somewhat earlier. Are all top managers making the best decisions for their company and the railroad industry? With dramatic change occurring almost daily, most management decisions appear to reflect the tendency to find solutions for short-term problems.

Let us face it—it is hard to address today's problems and opportunities when the immediate crisis requires immediate solutions in the context of what will be good for 1985. Yet this is the essential perspective which our managers must acquire. The question is not where railroading will be in 1985—but where do you want it to be, and how do we get there? When we have made that decision we can marshal those forces and direct our path to the future in transportation which deserves a private enterprise and a more profitable railroad system for us all. Thank you. (Applause)

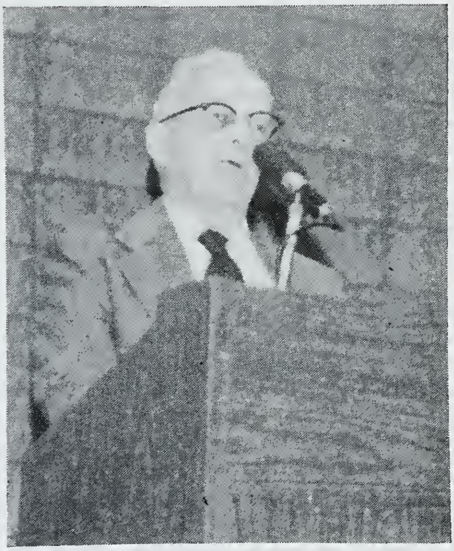
Mr. Gould: Thank you very much, Mr. Gray.

It is now my pleasure to introduce the next speaker, Mr. Robert G. Lewis, President of Simmons-Boardman Publishing Company and Railway Track & Structures magazine.

New Machine Will Make Work Easier

By ROBERT G. LEWIS

President, Simmons-Boardman Pub. Corp., New York



Robert G. Lewis

Thank you, Mr. Gould, and Presidents Sturm and Frame, distinguished members and guests:

It is a privilege to be here with you this morning and while I am pleased they did not go into our autobiographies in introducing us, I would like to mention that I worked one full year in my railroad career for Mr. Toon's railroad, the Bessemer & Lake Erie. I spent a very memorable year at Greenville, Pennsylvania.

New Machinery Will Make Efficiency

I do not have a speech to make. I am in a poor position to tell you folk how to run your business, but I have a few remarks I would like to make. They are very much reinforced by what I have seen here at the World Congress Center and out on the tracks at the Southern Industry yards. I have seen a great deal of innovative machinery, highly engineered products, which certainly are going to make our jobs more efficient in the years ahead to meet the challenges of increased costs, inflation and competition. It is really an eye opener.

Much gloom and doom about our industry has been given out over the past twenty or thirty years and the reputation of the industry we serve has not been so good. It is taking a new glow. All of us are very lucky to be working with or for an industry that has survived the onslaught of competition created by two wholly new means of transportation.

Combustion Engine Invention Hurt Railroads

Think about this. When the railroads came into being some one hundred fifty years ago, the internal combustion engine had not even been invented. The fastest way anything could move across the earth's surface was on or behind a horse. When the internal combustion engine was invented, or perfected, great sums of public money went into the structures that made its use possible. Not just for the private automobile owner, but for commercial trucking and other commercial enterprises.

In the meantime, the Wright Brothers came along and the second transportation technology was born. The development of modern aircraft came about principally through expenditures by the military and their associated structures, the airports. A communication system was developed, such as the highways, without any capital requirements upon the part of their users.

These two technologies, between them, just about crippled the passenger end of railroading, excepting for the inter-city services and the commuter services. I do not have to point out to this knowledgeable audience that the passenger sector never had any great importance to the railroads anyway. Even in the heyday of the railroads, before the automobile was perfected, before the paved highways and before the airplane, the greatest portion of income derived from passenger service was only twenty percent of the total railroad revenues. That is before we had automobiles or airplanes.

Despite Trucking and Air Cargo, Railroads Carrying More Tonnage

The miracle of our industry today, as I see it, is, here we are generating far more ton miles than even in the peak years of World War II, in spite of the development of two wholly new transportation methods generally supported by public monies.

The recent developments in energy, which I hardly need to go into, have highlighted the economic superiority of the railroads as a carrier of freight and you rarely hear any more the old cliche that the railroads are a dying industry. We hear it more than we would like to but in a few years that opinion of the railroads will be gone.

Absolutely none of the railway transportation miracle of moving ton miles around this country would have been possible without the product that is your responsibility, the bridges, the structures, the rights-of-way and tracks. It is the plant that you have built and maintain that makes it possible for us to compete successfully as private carriers against our competitors.

More money is going into the physical plant of the railroads than at any time in this century and that trend is certainly going to continue with the railroads sharing in the market. That means the job you do will become increasingly important.

We at Railway Age and Railway Track & Structures salute you. We hope you have a great convention. Thank you. (Applause)

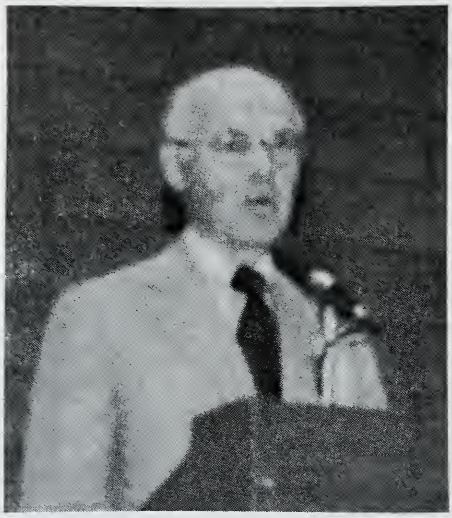
Mr. Gould: Thank you, Mr. Lewis.

It is now my pleasure to introduce Mr. Frank Richter, Publisher of Progressive Railroading.

Your Work and the Money Problem of Railroads . . .

By FRANK RICHTER

Publisher, Progressive Railroading, Chicago



Frank Richter

Thank you very much, and greetings, friends. I call you all friends because we have been together for a few days already, thanks to the opening of this annual affair, by having the Exhibition start a day early.

I will rest a little easier after having made these remarks because I am going to read to you some of the observations I put down prior to coming here. It reminds me very much of what a relief it is to me to deadline. We in the publishing business gripe among ourselves so much about the reality of deadlines, but often we keep on writing and rewriting our copy until that deadline does come. What I selected as the subject for my observations to you has been reaffirmed by what many of you have remarked about the reality of your work today and what can be seen in those beautiful pieces of machinery out there. Many of you would like to be able to sell Mr. Toon and his group, this machinery and to be able to put them into your improvement programs, the B & B programs, whatever way it happens to be. Much of what I am going to say to you also reflects some of the exposures and experiences I have had just recently to your counterparts in other parts of the world.

The title I have selected "Your Work and the Money Problems of Railroads" relates directly to the work you do, how much money it takes to get that work done, and what it means to the strength of any railroad.

Two Words Used to Define Address Topic

In other parts of the world two words are used to define that and they are coming in for much attention these days.

"Investments," one of the terms, was the theme of the recent 26th International Railway Congress held in Stockholm. As the Congress worked on the subject, it became not just a matter of putting money into a physical asset but the entire process of first determining where needs exist which take funds, and then deciding priorities as well as implementation.

What is important in terms of your own work responsibilities is that much was made at the Congress of (1) identifying and emphasizing railroad assets, (2) determining their relative importance so as to evaluate alternatives, such as going into more extensive tie renewals or bridge rehabilitation, and (3) reappraising the adequacy of the investment once it has been made.

"Infrastructure," the other term, is becoming the European way of identifying the entire physical plant of a railroad. It is what we identify as track, roadway, bridges and buildings, yards and terminals. It also includes signaling and communications.

It brings me to the point of my comments because the most fundamental part of the railroad infrastructure is that aspect of railroading to which your two associations are dedicated—the maintenance of right of way and the design and maintenance of bridges and buildings.

In both, our present ways of getting funds are highly inadequate.

Innovations and New Technologies Important

Just yesterday morning, as our annual meeting was beginning, I was told about a system on which the Burlington Northern is beginning to work to try to lease track work equipment, just like they and the utilities already lease locomotives and cars for that big buildup in transporting coal that is coming.

While your work is oriented to maintenance let us not lose sight of the degree to which the work of your two associations, over the past quarter of a century, has also put much emphasis upon newer technologies. Many such newer technologies required investments in order to be phased into your work. Others involved the more difficult matter of accepting innovation. Such technologies have had to be reliable, consistent in performance, and durable so that they could produce the return they were calculated to produce.

As all of you know, everything wears out. Even rocks age.

China's Great Wall Shows Man's Lasting Work

By way of digression, one of the profound experiences I have had in my travels was to see and to study the Great Wall of China. It is truly one of the wonders of the world, traversing not the valley, a plain between the mountain ranges, but the crest of one of the ranges. When we saw it during our Rail Study tour of China the wall climbed up and down as far as the eye could see. It was built out of large pieces of stone carried up the mountain side and put together as stone masonry, so exact that mortar was not needed. Where the rise was too steep for people to go up or down on the surface atop the wall steps of the stone were made. The wall on each side extends above that roadway to provide a protectional wall for those using it for defense. It had intermittent openings and parapets. The wall itself is wide enough for six horses to walk abreast.

Today, it serves as one of the great monuments to the lasting works which man has been able to create. At the point where we visited, the wall has been restored. We had an opportunity to go beyond the restored portion in the two directions away from the restoration. That is where the impact of the Great Wall hit us, for all that the non-restored portion lacks is straightening of the surface, smoothing it, and getting rid of the weeds. No crumbled nor crumbling rocks need to be replaced.

Chinese Railway Also a Monument

I must add two more points to this digression. The next day we inspected the hump retarder yard of the Chinese Railways at Peking. As we crossed a river on one bridge going and coming from the yard we could see a stone masonry bridge some 750 feet long being used for heavy vehicular traffic. It was built in the 1200's and has been used ever since!

To those of us on this tour, that lent credence not only to the excellent track of the railroads of China but also to the remarkable drainage with much masonry ditching and retaining walls, hard large-particle sized ballast, quality cross ties, and equally high quality track fittings (with four spikes per tie plate on wood ties).

Most importantly, all was well maintained. Weeds and mud just do not exist on the track section, even on secondary lines.

Investment Must Be Protected By Quality Maintenance

How that investment is protected by quality maintenance is fundamental—a fundamental that is omitted in the investment concepts of many or most of our railroads today.

When I do, as anyone can do, reach back into my memory to recall what I saw and knew of the Pennsylvania Railroad 25 to 35 years ago, it justified calling itself the Standard Railroad of the World. At that time, it was inconceivable that deterioration could take place so quickly. Even beyond the nicknamed "Chinese Wall" for the elevated trackage from downtown Philadelphia to 30th Street Station the Pennsylvania Railroad main line was the "Great Wall" of American Railroading. Catenaries and bridges were built to last forever, tracks with the heaviest rail, hard ballast, and superb drainage.

But that investment was not protected. It did not get the funds. Newer technologies were not applied. The railroad deteriorated. The investment now being applied is taking many times over what the investment theory would have had it been applied first and foremost to preserving that fine property.

Preserving property has been lost in the priorities of railroads today. Many railroads, for one reason or another, have missed the finer points in keeping their property strong.

In Europe, showing concern over investment and maintenance needs may appear to Americans to be an academic matter because the railroads are government-owned and subsidized. Right now, however, just about every country is pressuring its railroads to reduce their deficits. With that, the railroads had a strong purpose for selecting "Investments" as the central theme for the 26th International Railway Congress. That was done in the framework of retaining a strong infrastructure. And believe me, your work was not overlooked in their deliberations.

Two Fundamentals Emerge in Protecting Investments

It is from such experiences that two fundamentals emerge: (1) High caliber routine maintenance is vital, and (2) Unremitting attention, open mindedness, in fact eagerness, to find better ways and better materials are also vital.

You just cannot change to better ways and materials over night. Nor can the importance of getting started in applying better ways and materials be ignored. Both must be part of any railroads' investment/expenditure work because when improvements become better methods and materials, they also produce better returns. Those returns also can help other investments to be made.

At this point, you may be thinking to yourself, "Who is he kidding? Give us the machines, material, and men and we will keep the railroad in good shape."

That is so. It may be beyond you to do anything about getting the money. Many of you, however, contribute to the A and B planning on your railroad. You carry out the programs. You do the routine that is so basic that it does not even come under Additions and Betterments.

Some of the Problems of Protecting Investments

It is in all of those areas that the quality of workmanship, the desire to do the job well, the selection and training of the employees is carried out—and the changes and innovations are really put to work.

Much of what you folk are talking about, thinking about, relates to an improved approach to this business of being able to relate a need for a fine and continuing structure to the real problem of where the money is going to come from and how it is going to be applied. That involves a whole series of subjects. Time does not permit me to go into them, but I would like to list them as "buzz" words of subjects that you folk work with all the time.

—Such as central control rather than local control on major renewals.

—Such as cascading ties as well as rail, in order to have better control over your higher density, your greater revenue producing track.

—Phasing in and out the newer methods and newer approaches.

—Setting up the track to 10-year cycles, or 8-year, or 6-year, whatever it may be and the work procedures that are required in order to do that.

—The problem of getting track time for the work procedures and the opportunity of using multiple shifts on the higher cost equipment.

—Training and grading of personnel. The important problem of being able to fit the man and the machine better than using traditional methods of bidding on work.

Essentially this does relate to what I have identified as the investment theory. It essentially relates to the traditional way of processing A and B programs and your normal maintenance programs. It relates to the use of such techniques as linear programming, maintenance evaluation, cost control, and the use of the computer for that. It also becomes essential to railroad economics, because it relates to the effective way of running the newer operations that relate to transporting coal in order to be able to generate electricity more effectively.

It relates to what Mr. Toon said about the experience that the iron ore railroads have had in cycling improvements.

It relates to the amortization of all that work so that some means can be found to constantly upgrade.

Investments Protected By Doing Job Well

Now it may be beyond you to do anything about the above. Many of you, however, contribute to what we still call in many ways A and B planning on your railroads. You carry out the programs. You do the routine which is so basic that it does not come under A and B work.

It is in all of those areas that the quality of workmanship, the desire to do the job well, the selection and training of the employee, is carried out and changes and innovations are really put to work. That is where the meat is in the coconut.

Consequently, whether the investment decision is made, no matter how adequate the investment decision may be, or how inadequate it may be, the execution is yours. Consequently, I would like to repeat what I said earlier—to encourage you to do even more than what you have done so well in the past. That is to stress newer technologies as well as continuing to strive for high quality workmanship. I refer to the many bits of wisdom that have come out of your meetings, even the separate sections you will be going into in a few moments.

Thank you for your attention. I look forward to hearing your comments and information which is continuing to be an important part of the fabric of our association and your Association. Thank you. (Applause)

Mr. Gould: Thank you very much, Mr. Richter. I am sure we all want to show all these gentlemen our appreciation for coming this morning to speak to us. Let us give them a nice round of applause. (Applause)

I now turn the platform back to Wally Sturm.

President Sturm: Thank you, gentlemen, for sharing your thoughts with us. This concludes the final joint session of the Roadmasters and Bridge & Building Associations.

After a 10-minute break the Roadmasters will meet in this room and the Bridge and Building Association meeting will be held in Room 209, which is across the hall. Please assemble promptly as we both have a full schedule of presentations.

President Frame, do you have anything to add at this time?

President Frame: No, I do not.

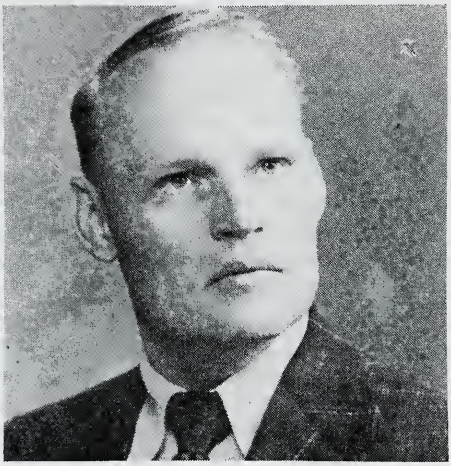
President Sturm: I now declare the joint session to be adjourned.

(Break)

President's Address

By W. C. STURM

Senior Project Engineer, E.J.&E., Joliet, Ill.



W. C. Sturm

Gentlemen please take your seats, will those at the door please advise people outside that the Bridge and Building session is about to begin. . . . Please close the doors.

I hereby declare this 84th Annual Conference of the American Railway Bridge and Building Association to be in order.

Welcome to Atlanta and to REMSA '79. We hope all of you have in the past two days availed yourself of the opportunity to attend the exhibits here at the World Congress Center and the on-track exhibits at the industry yard. As you are aware this is the first meeting of the Association to be held out of Chicago in 49 years, and, judging from the response, it appears that we will endeavor to hold other meetings away from Chicago. I would especially like to welcome those of you who are attending our Conference for the first time. If any Association is to remain a growing organization it must attract the younger members of our profession and encourage them to join the Association and participate fully in its activities. True benefit from the Association can only be realized by active participation.

As is required by the by-laws of our Association, I, as President am obligated to present to you a report describing the general condition of the Association.

The total membership of the Association as of June 1, 1979 was 666 a decline of 26 from the previous year. This can be attributed partially to consolidation within the industry and the financial situation of some roads. An effort must be made to attract those people who are eligible for membership but who for one reason or another have not applied for membership. All of us know people who are eligible for membership and we should take the time to encourage them to join the Association. This is particularly true of new employees. Considering the reduction in the number of employees in the railroad industry, however, the Association today probably has as high a percentage of eligible employees as members as at any time in the past. The financial condition of the Association remains very good. Despite a period of ever increasing inflation, the annual dues of the Association have remained at $7.00, a figure established in 1965. It appears that it shall not be necessary to increase the dues in the foreseeable future. To my knowledge, this is the lowest dues level of any major association. Our healthy financial status is due primarily to the sale of advertising in our annual proceedings. A professional advertising agency was engaged several years ago to handle our advertising sales and, through their efforts, the Association has been able to maintain a growing financial status. A detailed report will be presented by our Treasurer at tomorrow's business session.

This year all B&B registrants were presented with a portfolio bearing the new B&B logo. The convention greeting committee headed by director Jim Robertson was instrumental in the selection of this gift, which all of us will find very useful. We hope, in future years, other presentations may be made to conference registrants.

The program of ladies' activities has been expanded for this year's conference to provide more diversified activities. Monday morning an art and craft exhibit was held at the hotel during registration. Yesterday the ladies embarked on a bus tour to Stone Mountain Park which included a luncheon. This morning a bus tour to North Atlanta homes featuring the Swan House is about to embark. Ladies' activities will conclude this evening with the annual REMSA Banquet. The ladies' entertainment committee headed by Director Bill Stokely has arranged this excellent program.

Your Association during the past year has continued to maintain an effective liaison with other technical societies. The B&B Association is a contributing member of the Steel Structures Painting Council. Junior Vice President Ray McMaster attended their annual meeting on behalf of the Association. A meeting was held in St. Louis this year for the formation of a "Building Seismic Safety Council." The meeting was attended by Junior Vice President Joe Chambers. As a result the Bridge and Building Association has applied for membership in the council whose purpose is to enhance the public's safety by providing a national forum to foster improved seismic provisions for use by the building community. The council is an independent body under the auspices of the National Institute of Building Sciences. Your Association will continue its policy of monitoring the activities of related technical associations.

The Program Committee, under the direction of Senior Vice President Don Gould. has developed the excellent program for this conference. The committee reports, special features and guest speakers have been selected to bring you up-to-date on some of the current developments in our industry.

The activities of your Association are carried on by the diligent efforts of the executive committee. I will now introduce them to you. Will each member please stand as his name is called and remain standing. Please withhold your applause until all have been introduced.

Beginning at my extreme right, our junior directors are:

C. M. Russell, General B&B Supervisor, Southern Railroad, Greensboro, North Carolina. He is sponsor of Special Subjects Committee No. 2.

J. M. Williams, Supervisor B&B, Elgin, Joliet and Eastern Railway, Gary, Indiana. He is Chairman of the Resolutions Committee and sponsor of Special Subjects Committee No. 1.

Junior Director L. D. Green, Bridge Engineer Special Projects, St. Louis - San Francisco Railroad, Springfield, Missouri is unable to be with us. He is Chairman of the Necrology Committee and sponsor of Special Subjects Committee No. 3.

Our Intermediate Directors are:

O. C. Denz, Supervisor Building Maintenance, Milwaukee Road, Chicago, Illinois. He is Chairman of the very important Advertising Committee.

W. S. Stokely, Engineer Roadway, Illinois Central Gulf Railroad, Chicago, Illinois. He is Chairman of the Ladies Entertainment Committee, and is conducting the tour at this time.

Our Senior Directors are:

J. Budzileni, Assistant to Bridge Engineer, The Rock, Chicago, Illinois. He is Chairman of the Registration Desk Committee.

B. J. King, Bridge Engineer, Coast Lines, Santa Fe, Los Angeles, California. He is Chairman of the Special Subjects Committee.

J. G. Robertson, Manager Engineering Design, Bessemer and Lake Erie, Greenville, Pennsylvania. He is Chairman of the Public Relations and Greeting Committee.

Our Secretary, Mrs. Ann Wilson, is not able to be with us at this session due to her duties at the registration desk. She will be with us to present the Secretary's Report tomorrow morning.

Our Treasurer, Mr. W. F. Armstrong, was not able to be with us for the conference.

Our Junior Vice Presidents are:

R. C. McMaster, Manager Facilities and Structures, Bessemer and Lake Erie, Greenville, Pennsylvania. He is Chairman of the Special Features Committee.

J. W. Chambers, Bridge Construction Engineer, Missouri Pacific Railroad, St. Louis, Missouri. He is Chairman of the Membership and Proceedings Committees.

Our Senior Vice President is:

D. C. Gould, Assistant Structural Engineer, Union Pacific Railroad, Omaha, Nebraska. He is Chairman of the Convention Program Committee.

I am your President:

Walter C. Sturm, Senior Project Engineer, Elgin, Joliet and Eastern Railway Company, Joliet, Illinois and am Chairman of the Hotel Arrangements Committee.

You may now applaud.

Thank you gentlemen, you may now be seated.

As my term of office concludes with this conference, I wish to extend my sincere gratitude and appreciation for the cooperation of the Executive Committee. It has been a privilege to serve as President of your Association and I will in years to come serve this Association in any capacity which may be required.

Each year we look forward to the recognition of our Past Presidents who are in attendance. The introduction will be made by one of this select group. Will Erv Runde please come forward to make the introductions.

Mr. Runde introduced the Past Presidents as follows:

J. A. Jorlett, Retired Struc. Engineer, P. C., served as President 1955-56. He is also an Honorary Member.

M. H. Dick, Vice-Pres., Simmons-Boardman Publishing Co., served as President 1958-59. He is also an Honorary Member.

G. W. Benson, Retired Div. Engr., Central of Georgia, served as President 1961-62. Also an Honorary Member.

R. D. Hellweg, Retired Reg. Engr., Amtrak, served as President 1966-67.

J. W. DeValle, Retired Ch. Engr., Southern, served as President 1967-68.

J. A. Goforth, Chief Engr., Clinchfield R.R., served as President 1969-70.

T. L. Fuller, Engr. Bridges, S.P., served as President 1971-72.

E. E. Runde, Constr. Engr., Structures, I.C.G., served as President 1973-74.

W. H. Rankin, Sr. Str. Engr., SL/SF, served as President 1976-77.

Thank you Mr. Runde. It is a pleasure to have our past presidents with us today.

The primary objective of this Association is the advancement of knowledge pertaining to the design, construction and maintenance of railway bridges, buildings and related facilities. This objective is met by the presentation of reports based on the investigation of our special subjects committees.

Following each report you are encouraged to participate in the discussion and to ask questions. In doing so please stand, state your name and affiliation and direct your question to the chairman. Members of the executive committee will be in the aisles to assist you with the microphones.

The first feature on this morning's program will be the report of Special Subjects Committee No. 1, "Track Scales." The sponsor of this committee is Mr. J. M. Williams, who will introduce the chairman.

Mr. Williams: It is my pleasure to introduce our next speaker, Mr. W. J. Gunkle.

Track Scales

SPECIAL SUBJECT REPORT NO. 1

COMMITTEE—W. J. GUNKLE, *Chairman*, sr. str. insp., ConRail, Philadelphia, Pa.; M. P. BHALAKIA, *Vice Chairman*, design & constr. engr., P.&L.E., Pittsburgh, Pa.; FRED DAY, asst. engr/str. mtce., ConRail, Philadelphia, Pa.; J. W. DAVIDSON, asst. dir. br. engr., B.N., St. Paul, Minn.; J. E. FOREMAN, dir. engr. services, B.&L.E., Greenville, Pa.; C. R. LUND, asst supvr. bldg. mtce., Milwaukee, Chicago, Ill.; M. R. MURPHY, b&b supvr., U.P., Pocatello, Idaho; W. H. RANKIN, sr. str. engr., SL/SF, Springfield, Mo.; E. E. RUNDE, constr. engr. str., I.C.G., Chicago, Ill.; J. F. SCHMITZ, br. & bldg. supt., M.P., N. Little Rock, Ark.

W. J. Gunkle

It is my pleasure to speak to you today concerning railroad weighing and railroad track scales.

Many years ago, the early railroads agreed to move shipper's cargoes by carload lots. Like all things, it started out well with conservative shipments. Human nature got into the act and the first thing you know, cars were overloaded. One of the old illustrations was on bales of cotton. The carriers agreed to haul "X" number of bales per car for "X" number of dollars. Just fine, but shortly the size of the bales were increased tremendously. It did not take long until the railroads were forced into weighing railroad cars.

A number of old-scale companies—Howe, Fairbanks, Standard, Strait and others were quick to gear production of railroad track scales. Early track scales were 39 ft., 42 ft., 46 ft. and 52 ft. long. Most of them had a capacity of 100,000 lb., but a few went to 250,000 or 300,000 lb.

Many larger industries could see the advantages of having their own scales and had them installed on their property.

The scales were used for the cars weighed statically in a single draft (which is still the ideal way of achieving accurate weights).

Railroads work with NBS

The railroads formed their own scale departments and worked jointly with the National Bureau of Standards in calibrating test-weight cars to control the accuracy of the new devices. As time progressed, the railroads (major roads) installed their own master scales. These scales were calibrated and approved by the National Bureau of Standards. This approval granted the roads the right to calibrate their own test equipment.

Some of the larger roads designed track scales to suit their needs and manufactured them. Many of them are still in service today.

Fortunately, our predecessors had looked to the future and built the scales large enough to handle the needs for many years.

Eventually the cars were too long and too heavy to be weighed in a single draft. Two-draft weighing was adopted with a variety of recommendations as to just how the weighing was to be done. The weighing time was greatly increased and the accuracy reduced.

Newer scales were installed at heavy weigh points. Many were up to 65 ft. in length. A number of them had a capacity of 400,000 lb. These new monsters were expensive and did not reduce the weighing costs. Classification yards would rate even longer scales that would enable a competent weighmaster to weigh the car almost in motion.

These scales were generally installed on a 0.8% grade. Riders (brakemen) would board the cars as they entered the hump. Each car was cut loose and the rider would use the hand brake to slow or stop the car for the weighmaster to weigh it.

Upon completion of the weighing, the weigher set off an air horn signaling the rider that the car was weighed. The rider then released the handbrakes, allowing the car to proceed to its allocated class track. He would set the hand brake so as to prevent excessive impact. He would then get off the car, walk over to shuttle station and get a ride back up to the hump. A busy hump would have two crews and utilize up to seventy-five riders on the daylight shift. The second and third shifts would have a slightly reduced force.

The scale had a 200-lb. rider poise on the weighbeam. This poise, when in a forward position, automatically allowed for the weight of the rider.

Print-out wheel is adopted

The Streeter-Amet Scale Company automated this type of scale by adapting the existing weighbeam with a print-out wheel. The first set of wheels of the forward truck actuated a trigger switch that set off a timer, preventing a print-out until the car had been scale borne for a designated period of time.

They were very crude under today's standards but they weighed a great number of cars. Some of these scales are still in service at a few locations. The minimum graduation was 200 lb. Basically, they produced acceptable weights.

During the earlier years practically all cars were weighed. The railroads had "weighmasters" who were very proud of their jobs and performed their duties in a very efficient manner and were a well respected group.

Apparently, many problems originated in interline shipments. Shortages kept popping up. Someone had to determine the cause.

Supposing the consignee complained that his shipment was not complete. What was the cause?

Was it due to pilferage?

Was it due to the coopering of the cars?

Was it due to an inaccurate point of origin weight?

Finally, the Class I railroads decided to form inspection and weighing bureaus. The main ones in the United States are the "Eastern," "Western" and

"Southern" inspection and weighing bureaus.

These bureaus prepare and execute agreements between the shippers and the carriers.

Industry scale avoids re-weighing

When a railroad serving an industry tests and approves an industry-owned track-scale, they notify the appropriate weighing bureau and the weighing bureau writes the "Shippers Weight Agreement." One of the main features of this agreement is that the Class I railroads will now accept the industries weights and will not have to weigh their cars.

These weighing bureaus are doing a tremendous job and probably save the railroads from weighing up to 90% of their cars.

Ore hopper scales were installed at the ore piers to prevent overloading of the cars. This helped lighten the burden on the track scales.

Partially, due to the reduction of cars weighed, many of the weighmasters jobs were abolished. Yard clerks and train service personnel were assigned to the weighing. In many cases they were unhappy about this and the accuracy of the weights could have suffered.

Let us now review the present-day equipment and the weighing of cars at this time.

Not long after the steam locomotive had been replaced by the diesel locomotive, the mechanical scales started to lose ground to the electronics.

Although electronic weighing is still somewhat controversial, more than 90% of the new scales are electronic.

Probably the best of the electronic scales today is the single-draft scale where cars are weighed statically. This scale, when monitored frequently, will provide good weights consistently, and will provide all the "goodies" for waybill information, which is the date, time, location, weigher, gross, tare and net weights. Many of these items are indicated by symbols. This type of weighing delays car movement and is an expensive means of weighing.

Motion weighing

Other full-length scales on the humps or on the class tracks provide "motion" single-draft weighing. Perhaps a slight reduction in accuracy but yard delays are reduced. Hump scales permit car classification without rehandling of the cars.

Some yards will utilize scales from 3 ft.-6 in. up to 20 ft.-0 in. for "axle" and 2-draft weighing. All of these are motion weighers. Some are coupled-in-motion weighers. They are somewhat more sophisticated and are not likely to weigh as accurately as the previously mentioned scales.

The "money makers" are the coupled-in-motion scales located alongside of the main lines. These scales are usually referred to as "weighing systems." Many are at remote locations and are equipped with scanners. Many of them are 3 ft.-6 in. in length. The speed of the train is usually restricted to 3½ mph while being weighed. Now weigh trains over the scales dare not exceed 10 mph. Car utilization is excellent. Train-load weights are extremely accurate. The "humaan element" is completely eliminated and often a train will be less than 0.2% error. These systems have mini-computers and deliver the pertinent information to the master computer that provides instant billing at a minimum of time and expense.

Individual car weights may vary due to numerous circumstances. To name a few: rough handling on the train, locomotives that perform poorly, poor scale maintenance such as poor transition over weigh and approach rails.

Failures are frequent and often due to electrical irregularities, storms and high water. It is virtually impossible to provide 100% lightning protection.

Requires frequent monitoring

This type of equipment must have frequent monitoring. Although the progress is slow on improving these devices, it appears to be inevitable that this will be the weighing of the future.

Like all phases of railroading, we employees, working together, can greatly improve our company's cash flow through these cash registers. It requires dedicated employees in all departments —maintenance of way, transportation, C&S, maintenance of equipment—all are equally important. Highly important is the careful and proper handling of trains. This not only helps accurate weighing but extends the life of the scale. The approaches are the lifeline of the scale. Smooth running equipment, with good clean labels, properly located, help tremendously. The C&S should check the electronics regularly.

The billing bureau improves the railroad's cash flow with advance billing when it receives accurate ungarbled information.

The scale department is responsible for the accuracy of the scale which includes calibrating, testing and monitoring. The monitoring really polices the overloads as well as the revenue.

Now I would like to show you a group of slides showing scale installation at various locations.

Please recognize the scales and weighing systems as being one of the top needs of our railroads today.

If anyone has any questions, I will be glad to try and answer them.

President Sturm: Thank you, Mr. Gunkle for your timely report.

Inspection and rehabilitation of our existing structures is a subject of prime importance to all of us. Will Vice President Ray McMaster please come forward to introduce our next speaker.

Mr. McMaster: Mr. Lichtenstein attended Ohio State University where he received a Bachelor of Civil Engineering Degree in 1948. He was selected for the Brown Scholarship as the best graduate in his class. In May 1973, Ohio State University conferred on him the Distinguished Alumnus Award. He was honored by the New Jersey Society of Professional Engineers (Bergen Chapter) as Engineer of the Year—1976.

He worked for various Consulting Engineering firms in the bridge design field. In 1956 he became a Participant Associate and Chief Bridge Engineer for Goodkind and O'Dea, Montclair, New Jersey. In 1963, he started his own consulting firm, which specializes in the design of bridges and highways, and evaluation of existing bridges. Since 1965 his company has inspected and evaluated close to 1,000 bridges. These included various movable and fixed structures for highways, railroads, and pedestrian use.

Mr. Lichtenstein has taught Bridge Evaluation Seminars at Cornell University, Rutgers University, University of Missouri—Rolla, University of Pennsylvania, and short courses at Hofstra University. He has also taught courses at Ohio State University, University of Wisconsin and George Washington University.

He is licensed as a Professional Engineer in the states of New Jersey, New York, Delaware, Connecticut, West Virginia, Pennsylvania and Massachusetts and was granted a National Council of Engineering Examiners Certificate. He is a Fellow of the American Association of Civil Engineers, Member of the National Society of Professional Engineers, National Association of County Engineers, Prestressed Concrete Institute, and the American Concrete Institute. He has also been elected to the honor societies of Tau Beta Pi and Sigma Xi. Mr. Lichtenstein is listed in Who's Who in the East, and Who's Who in Engineering.

It is with great pleasure that I present Al Lichtenstein.

Inspectation and Rehabilitation of Railroad Bridges

By A. G. LICHTENSTEIN, P.E.

President, A. G. Lichtenstein & Associates, Inc., Teaneck, New Jersey

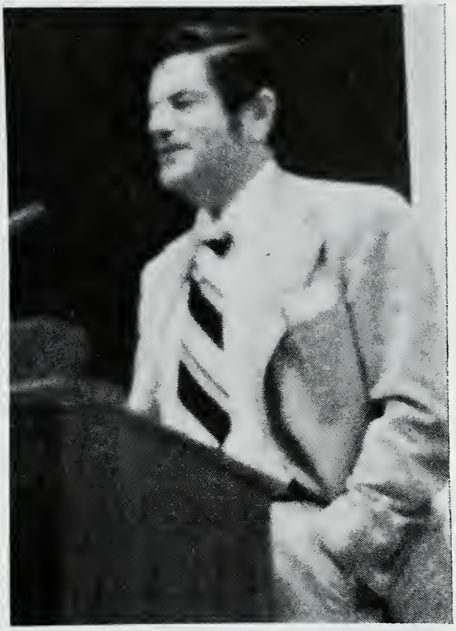
SYNOPSIS:

Existing railroad bridges can be repaired and upgraded to perform their proper function of carrying railroad loads assigned to them. Just because a bridge is 50 years old or more, it should not be demolished arbitrarily and replaced.

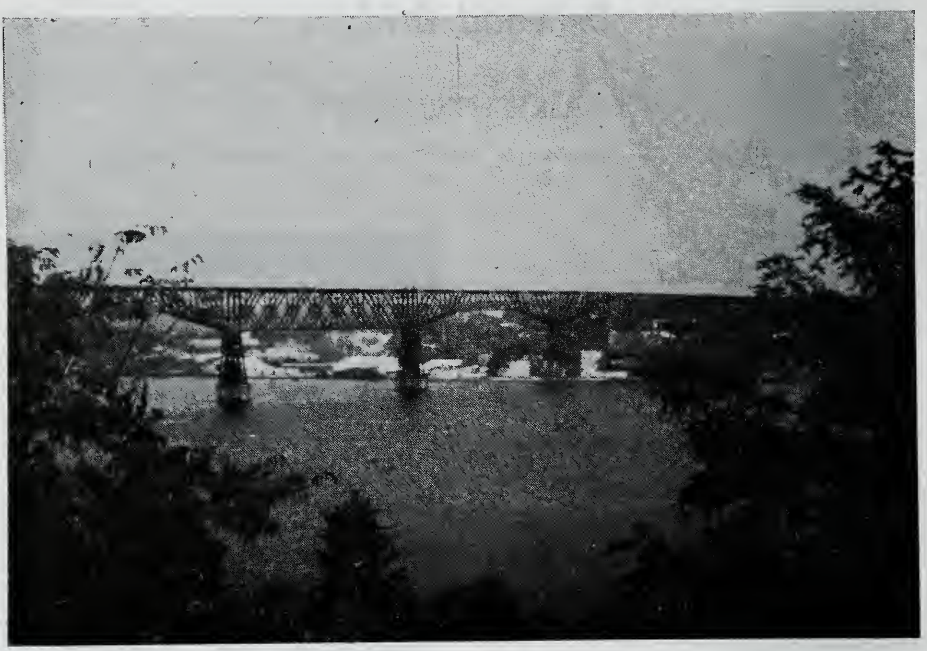
An In-Depth Inspection establishing the strength and condition of the bridge, as well as the type of materials and foundations, will reveal that in most instances that a Rehabilitation is possible and definitely more economical. While the theoretical life expectancy of an upgraded bridge would be 25 to 30 years, experience has shown that this is a conservative estimate. Many railroad bridges are owned by efficient and progressive railroad companies, who know the loadings and freight weights and speeds crossing their bridges. In these instances, an allowable stress for steel design equal to 80% of the yield point is acceptable. Where railroads have been taken over or merged into larger groups, a more conservative allowable stress should be selected.

Examples were shown of several major high-level fixed and movable railroad bridges.

1) The Poughkeepsie Railroad Bridge over the Hudson River—owned by ConRail, presently closed because of fire damage, but otherwise in fair condition. The bridge is on the National Register of Historic Structures and is being studied for reactivation into a New Haven, Connecticut to New York track line.
2) Manasquan River Bridge in Point Pleasant, New Jersey has a Scherzer movable span, abutted on each side by many steel stringer spans. The bridge was found by inspection to be in extremely unsafe and deteriorated condition. The movable segmental girders and track girders were completely corroded, overstressed, and cracked. The Project involved repairing the portions of the segmental girders, complete replacement of the track girders, and replacement of the steel stringer spans with a specially designed pre-stressed concrete section. The total Project cost



A. G. Lichtenstein



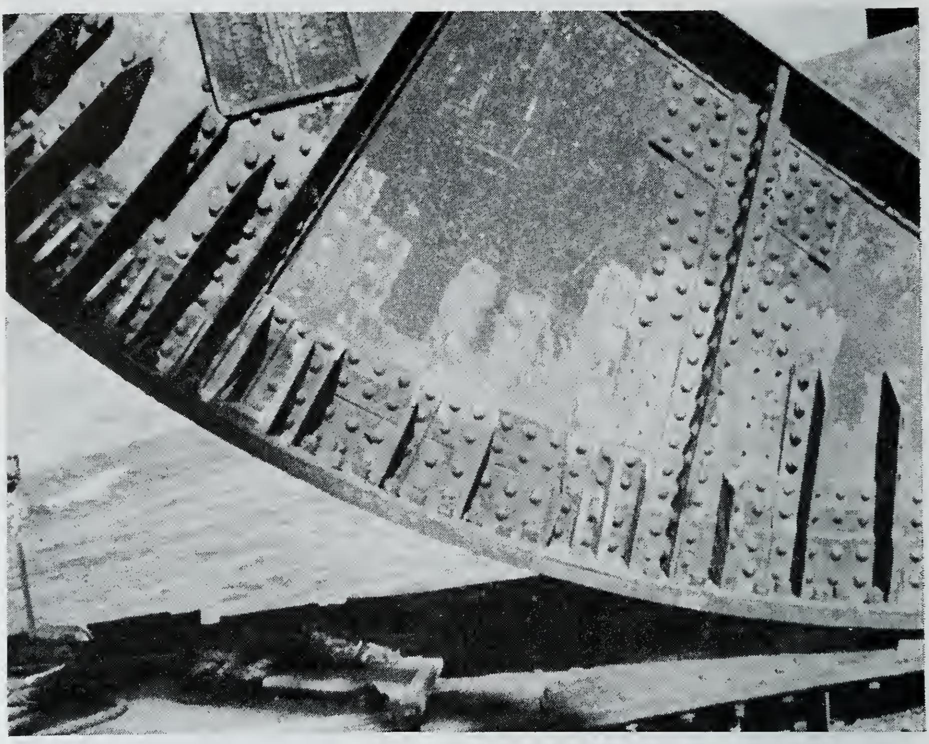
Poughkeepsie Bridge over the Hudson River—built before the turn of the century and is included in the National Register as a historic structure.

Poughkeepsie Bridge over the Hudson River—built before the turn of the century and is included in the National Register as a historic structure.

Manasquan Railroad Bridge
Scherzer Movable Span

was approximately $2,500,000 and was completed with a minimum of interference to Navigation and maximum delay of 30 days to the train movement.

3) Three (3) major movable bridges were described on the Northeast Corridor Improvement Project: a) Walk Bridge swinger span in Norwalk over the Norwalk River; b) A regular Scherzer Bascule in Devon over the Housatonic



Manasquan Railroad Bridge
Scherzer Movable Span

River; and c) A Reversed Scherzer in Cos Cob over the Mianus River. This $20,000,000 up-grading and strengthening project compares with a construction cost of approximately $100,000,000 for three completely new bridges at these locations.

4) A brief description was given of a Fink Truss which was the last remaining bridge of this type designed by Mr. Albert Fink in 1854. Slides were shown of the condition of the structure before an accident in October, 1978 demolished it completely. A study performed for the replacement of this unique Fink Truss revealed that a recasting with modern steel of all of the structural compression elements was feasible, using ductile steel and erecting the bridge in the same way it was constructed by Mr. Fink.

The speaker thanked the B & B Association and particularly Mr. Sturm and Mr. McMaster for permitting him to present his views to the Membership.

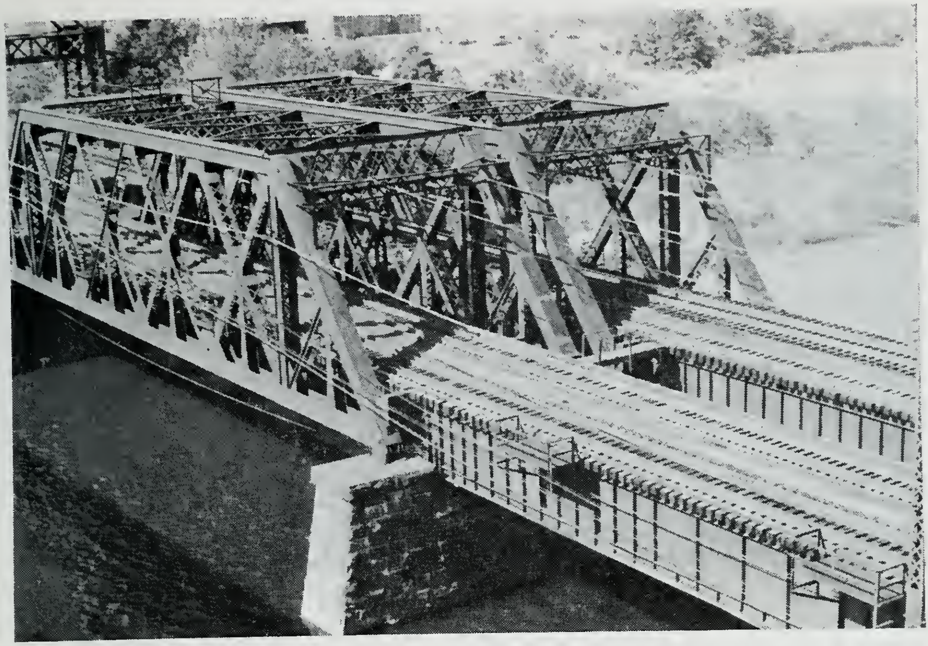
President Sturm: Thank you, Mr. Lichtenstein for sharing your experience with us.

This concludes this morning's session. The afternoon is free for viewing REMSA '79. The report from the registration desk is as follows: 843 Roadmasters, 166 Bridge & Building, 1291 guests, 384 ladies are registered for a total of 2300.

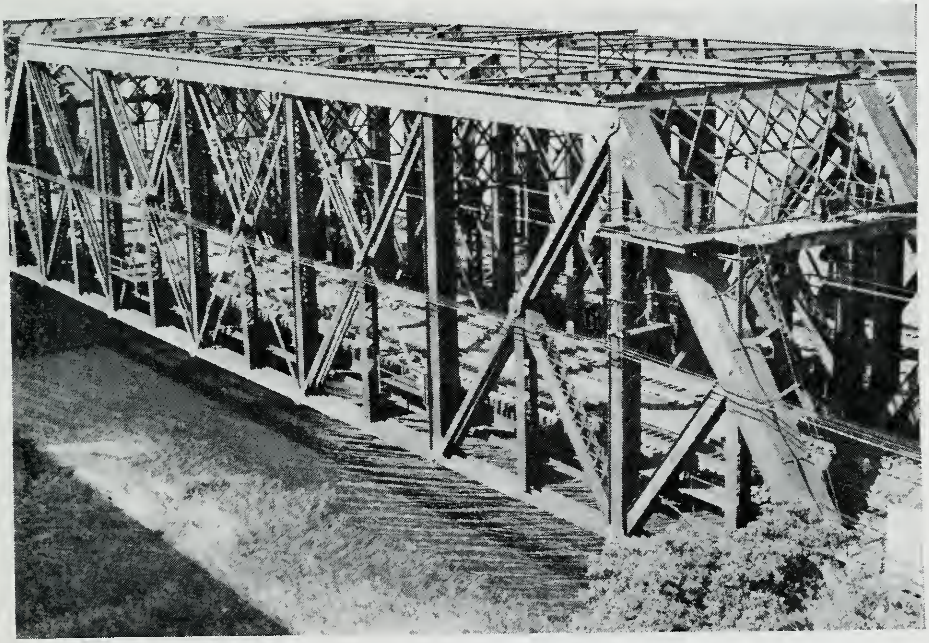
Our meeting will reconvene in this room tomorrow morning at 9:00 a.m.

I hope all of you will be in attendance at the REMSA banquet this evening.

This meeting is adjourned.



Conrail bridge over Housatonic River, including Scherzer Movable Span—Northeast Corridor—Devon, Connecticut.



Conrail bridge over Housatonic River, including Scherzer Movable Span—Northeast Corridor—Devon, Connecticut.

MORNING SESSION

October 18, 1979

THE BOARD OF DIRECTORS
From left to right: B. J. King, J. W. Chambers, R. C. McMaster, J. E. Robertson, Ann Wilson, W. C. Sturm, D. C. Gould, O. C. Denz, J. M. Williams and C. M. Russell.

President Sturm: The meeting will come to order.

Good morning, members and guests. Welcome to the final session of the 84th Annual Conference of the American Railway Bridge and Building Association. Will the officers and directors of the Association please come forward and our Business Session will begin?

The reports which will now be presented are intended to inform you about the business affairs of our association. If you have any questions regarding one of the reports, please wait until all of the reports have been presented and we will attempt to answer your questions.

Our Secretary, Mrs. Ann Wilson, was unable to be present during the introduction of our officers and directors at the opening session. It is my pleasure to introduce her to you at this time. Ann provides the continuity that enables our Association to function on a day-to-day basis. She will now present the Secretary's Report.

Secretary's Report

Report of Membership for Period September 15, 1978 to October 1, 1979

ACTIVE MEMBERS

Total Active Members September 15, 1978	411
New Active Members since 9/15/78	25

Reinstated—paid back dues		5	
Transferred from Associate		1	
		442	
LESS: Resigned account retirement	8		
Transferred to Life	5		
Transferred to Associate	1		
Dropped for non-payment of dues	27	41	
TOTAL ACTIVE MEMBERS			401
ASSOCIATE MEMBERS			
Total Associate Members 9/15/78		88	
New Associate Members since 9/15/78		5	
Transferred from Active		1	
		94	
LESS: Transferred to Active	1		
Resigned account retirement	6		
Transferred to Life	1		
Dropped for non-payment of dues	4	12	
TOTAL ASSOCIATE MEMBERS			82
LIFE MEMBERS			
Total Life Members September 15, 1978		155	
Transferred from Active Membership		5	
Transferred from Associate		1	
		161	
LESS: Reported deceased	11		
Transferred to Honorary	1	12	
TOTAL LIFE MEMBERS			149
HONORARY MEMBERS			
Total Honorary Members September 15, 1978	9		
Transferred from Life	1		
TOTAL HONORARY MEMBERS			10
TOTAL MEMBERSHIP—ALL CLASSES—October 1, 1979			642

Sept. 15, 1978—	Active	411
	Associate	88
	Life	157
	Honorary	9
	Total	663

President Sturm: Thank you Mrs. Wilson. Our Treasurer, Mr. W. F. Armstrong is unable to be with us. The Treasurer's Report will be presented by Junior Vice President J. W. Chambers.

Treasurer's Report

Period September 1, 1978 to August 31, 1979

Checking Account balance August 31, 1978		$ 1,591.97
RECEIPTS:		
Dues	$ 3,459.05	
1976 Advertising	275.00	
1977 Advertising	11,624.78	
Transfer of funds from S/L	3,500.00	
1978 Advertising	1,090.00	19,948.83
		$ 21,540.80

DISBURSEMENTS:		
Salaries (Secretary & Assistant)	$ 4,107.60	
FICA (On payroll)	250.46	
Office Rent, Telephone, etc.	498.92	
Stationery & Printing	652.38	
Postage	835.68	
Office Supplies	101.62	
1976 Advertising (APC)	110.00	
1977 Advertising (APC)	4,796.78	
1978 Advertising (APC)	436.00	
1978 Conference Expense	1,019.73	
Membership Certificates	322.60	
1977 Proceedings	5,216.12	
1978 Proceedings	180.00	
State of Illinois—Unemployment Tax	38.44	
Contributions	300.00	
Federal Unemployment Tax	15.12	
Executive Board Meetings	859.28	
Miscellaneous	353.60	$ 20,094.33

CHECKING ACCOUNT BALANCE—August 31, 1979	$ 1,446.47
Homewood Federal S/L Assn. (5¼%)	102.77
Homewood Federal S/L Assn. (6¾%) 8/29/80	7,416.87
Homewood Federal S/L Assn. (6¾%) 2/20/80	2,874.27
Homewood Federal S/L Assn. (6¾%) 12/22/80	3,818.60
	$ 15,658.98

Balance 8/31/78 — $18,327.98

President Sturm: Thank you Mr. Chambers. The Auditing Committee has examined the books of the Association and the report of that committee will be presented by O. C. Denz.

Report of Auditing Committee

September 25, 1979

TO MEMBERS OF THE AMERICAN
RAILWAY BRIDGE & BUILDING ASSOCIATION

Gentlemen:

The undersigned have examined the books of the Secretary and report of the Treasurer for the period from September 1, 1978 to August 31, 1979 inclusive and have found them to be correct as of the latter date.

Respectfully submitted,
E. R. Schlaf, Chairman
H. F. Lucas

President Sturm: You have heard the reports of the Secretary, Treasurer and the Auditing Committee. Does anyone have any questions or discussion regarding these reports? If not, I will entertain a motion that these reports be accepted as presented.

It has been moved and seconded that the reports of the Secretary, the Treasurer and the Auditing Committee be accepted as presented. All in favor signify by saying "aye" (pause) opposed "nay" (pause). The motion is carried and the reports accepted as presented.

The Chairman of the Resolutions Committee is Mr. J. M. Williams. He will now present their report.

Report of Resolutions Committee

MR. PRESIDENT, as a token of appreciation for the time and effort certain individuals and organizations have contributed to make this, the 84th Meeting in the 89th year of the American Railway Bridge & Building Association an outstanding success, the resolutions committee presents the following resolutions:

BE IT HEREBY RESOLVED that the thanks of the Association be extended to C. J. Reaves, Pastor, North Decatur United Methodist Church, who was so kind to come among us and invoke the blessing for spiritual assurance.

BE IT FURTHER RESOLVED that the thanks of the Association be expressed to the prominent speakers who gave of their time and so capably shared their knowledge and counsel with us, especially A.RE.A., Vice President M. Rougas; REMSA President R. C. Crosby; MARTA Assistant Program Manager for special projects, James Gilland; L&N R. R. Co., President R. D. Spence; E. J. & E. Ry. Co. President M. S. Toon; Railway Publishers F. E. Gray, R. G. Lewis and Frank Richter; N.R.P.C. Manager, Engineering Design, J. N. Michel; Ambridge Division U.S. S. Senior Welding Engineer David McQuaid; A. G. Lichtenstein & Associates, President A. G. Lichtenstein.

BE IT FURTHER RESOLVED that our thanks be expressed to Mrs. R. E. Frame and Mrs. W. C. Sturm and their committees for their efforts in arranging registration and entertainment for our wives and to the untiring efforts of the ladies who assisted with registration.

AND, BE IT FINALLY RESOLVED that the Association express its thanks to its chairmen and their committees for their work in preparing the reports which were presented at the meeting, also to the Southern Railway Company and the Family Lines who provided assistance at the Registration desk, to the Atlanta Convention Bureau for arranging accommodations at the various hotels, to the World Congress Center for their cooperation and hospitality, to the Hyatt Regency Atlanta for their gracious southern hospitality, to REMSA and all its members for the fine banquet we enjoyed last evening and outstanding exhibits; as well as to the members of our executive committee and to our President, Mr. W. C. Sturm, who has spent so much of his own time and effort in guiding the affairs of our Association over the past year.

MR. PRESIDENT, we recommend these resolutions be made a part of the official record of this association and that copies be presented to all concerned parties.

Respectfully submitted,
J. M. Williams, Chairman

President Sturm: Thank you, Mr. Williams. Mr. W. S. Stokely will now present the report of the Necrology Committee.

Report of Necrology Committee

To the President and Members of the
AMERICAN RAILWAY BRIDGE & BUILDING ASSOCIATION

It is with grief and regret that we report the known loss of eleven (11) members through death during the past year. It is possible that other members have passed away during the year of whom we have no information. If you know of any, please report their names to the Secretary. The following have been reported since our Last Annual Meeting in September 1978.

Life Members	Title-Railroad-Location	Joined	Deceased
A. Anderson	Engr. Grade Crossings New York Central Colorado Springs, Colo.	1947	1979
R. H. Beeder	Ch. Engr. Sys. A.T.&S.F. Colorado Springs, Colo.	1958	1979
F. H. Cramer	Br. Engr. C.B.&Q. Lawrenceville, Ill.	1927	1979

E. M. Enger	Div. Engr. C.&N.W. St. Paul, Minn.	1947	1977
A. B. Hillman	Ch. Engr. C. B. Railway, C.&W. Ind. Evanston, Ill.	1942	1978
W. G. Kemmerer	Engr. B.&B. Pennsylvania Narberth, Pa.	1931	1979
B. W. Merrill	B.&B. Supvr. N.&W. Ry. Conneaut, Ohio	1936	1978
A. H. Pearson	Mast. Carpenter C.B.&Q. St. Joseph, Mo.	1952	1978
M. L. Reynolds	B.&B. Supvr. Southern Pacific R. R. Nevada City, Ca.	1958	1979
B. M. Stephens	Asst. Gen. Mgr. Southern Pacific R. R. Houston, Tex.	1946	1978
M. E. Weller	Sr. Proj. Engr. E.J.&E. Ry. Joliet, Ill.	1962	1978

Respectfully submitted,
L. D. Green, Chairman

President Sturm: Thank you Mr. Stokely. In remembrance of these members, let us stand for a moment of silence.

As the activities of the 84th Annual Conference comes to a close, three of our Directors will have completed their service on the Executive Committee. Each of them has spent many hours carrying on the work of the Association. In recognition of their service to the Association I am proud to present them with certificates commemorating their tenure on the Executive Committee.

Will Messrs. Budzileni, King and Robertson please come forward.

Gentlemen, please accept these certificates as an expression of gratitude from the Association.

(Presents Certificates)

The Nominating Committee is composed of the five most recent past presidents. A member of this committee, Past President Warren Rankin, at this time will present to you the selections of that committee for officers and directors to serve the Association for the coming year.

Outgoing President, W. C. Sturm, right, presenting gavel to incoming President, D. C. Gould, left.

Report of Nominating Committee

The Nominating Committee of the American Railway Bridge and Building Association respectfully submit to the membership the following slate of Officers and Directors with the recommendation that they be elected for the terms specified:

For President:	D. C. Gould, Asst. Str. Engr. U.P., Omaha, Nebraska
For Sr. Vice President:	J. W. Chambers, Bridge Constr. Engr. M.P., St. Louis, Missouri
For Jr. Vice President:	R. C. McMasters, Mgr. Facilities and Structures B&LE, Greenville, Pa.
For Jr. Vice President:	W. R. Hyma, Bridge Engr. System Santa Fe, Chicago
For Director for term expiring in 1980:	W. J. Gunkle, Sr. Structural Insp. Conrail, Philadelphia, Pa.
For Directors for term expiring in 1982:	P. H. Saletnik, Ass't Building Engineer C&NW, Chicago, Ill.
	J. M. Michel, Mgr. Engr. Design. AMTRAK, Washington, D.C.
	D. A. Bessey, Ass't Chf. Engr.-Structures C.M.St.P&P, Chicago, Ill.
For Secretary:	Ann Wilson
For Treasurer:	W. F. Armstrong

Additional candidates may be nominated from the floor. The election will be held immediately following the program this morning.

President Sturm: Is any other business to be brought to the attention of the Association? If not, the business session is adjourned and the officers and directors excused.

The first presentation on this morning's program will be the report of Special Subjects Committee No. 2 "Clearance of Oversized Loads." The sponsor of this committee is Mr. C. M. Russell, who will introduce the chairman.

(Mr. C. M. Russell introduces Mr. J. C. Calhoun)

Clearance of Oversized Loads

SPECIAL SUBJECT REPORT NO. 2

COMMITTEE—J. C. CALHOUN, *Chairman*, gen. b&b supvr., Southern, Chattanooga, Tenn.; O. D. ANTHONY, *Vice Chairman*, asst. ch. engr. br. & str., B&A, Bangor, Maine; J. E. BLAKE, engr. str., ConRail, Pittsburgh, Pa.; W. E. BRAKENSIEK, asst. ch. engr., M.P., St. Louis, Mo.; J. BUDZILENI, asst. to br. engr., Rock, Chicago, Ill.; J. W. DAVIDSON, asst. dir. br. engr., B.N., St. Paul, Minn.; J. DE VALLE, chief engr. br., Southern, Atlanta, Ga.; A. E. MOONEY, engr. constr., Clinchfield, Erwin, Tenn.; J. G. ROBERTSON, mgr. engr. design., B.&L.E., Greenville, Pa.; R. J. SLIEPKA, sr. des. engr., E.J.&E., Joliet, Ill.

An underlying profit factor we in the Maintenance of Way Department, and particularly in the B&B Department tend to overlook, or haven't taken the time to really examine is moving oversized loads.

Usually, when we speak of "profit" in our department, we automatically think in terms of productivity and efficiency in our day-to-day operations. "Profit" means, to most of us, squeezing the most out of each maintenance and capital dollar allotted to us.

But, if you will stop and think just a moment of the unique advantage we enjoy as a transportation mode, you can see the tip of the underlying factor mentioned above.

We are talking about our almost exclusive capability to move oversized, (and overweight), loads from point to point. In terms of speed, along with safety of movement, shipment by rail is the logical way. Complete assemblies

J. C. Calhoun

of large components are shipped by rail almost every day, saving the valuable assembly time at the destination.

This capability we have to move such loads gives us a competitive edge and therein lies the profit.

One small hitch is at various locations, due to a variety of reasons, we have conditions which restrict the movement of oversized loads.

Give me a moment here to thank all those railroads which responded so favorably to my request for slides, along with their comments about this report. I could not hope to use all the slides contributed in this short report. The ones you will see represent only a small sampling of the ones available.

(Series of slides depicting restrictive conditions on various roads)

Now, without naming the railroads, here is a summary of the various methods used to meet the clearance requirements as they arise.

Ordinarily a clearance request begins on the drawing board of a manufacturing company's engineering department. The concept for a new type machine, or, the modification of an existing component, takes shape on paper at some point. It may take on extra size or weight. The company's marketing section is contacted which, in turn, contacts the railroad sales representative. The problem for moving this oversized creation then belongs to the railroad.

Depending upon the individual railroad, the request for clearance is routed through the Transportation Department or directly to the Engineering Department.

If the load in question falls within the restriction limit for the line, or lines, it is to move over, an affirmative answer is quickly given. If not, modification of the load itself or to the restrictive obstructions along the route, (and the cost for such) is suggested. A solution is reached, modifications are made, shipment is made, money changes hands, tomorrow is another day.

Sounds simple, does it not?

But, here is what is involved.

Some railroads maintain very large departments of up to fifteen people directly involved in maintaining and upgrading clearance data, while others have only one or two people so involved and even then share other duties. It depends mostly on the size of the railroad, the frequency of requests, and the overall need of a particular line.

One thing that is noteworthy here is that the coordination and cooperation between and among railroads for oversized shipments over two or more lines is very good. It has to be!

The methods used for gathering clearance data are as interesting as they are varied.

Whether it is simply to update current records on a systematic basis and/or to physically check the proposed route for an upcoming move, the responsibility and methods differ from road to road.

On some, each division does its own field work, while most of the others have a department or sub-department charged with clearance work for the whole line.

(Series of slides showing various clearance cars)

Of course, new construction work, T & S, and any other factor affecting clearance is sent to the proper department for updating records. This should be the responsibility of each of us to see that it is not overlooked.

(Series of slides showing T & S work, overhead bridge, new construction)

Here is a clearance problem the Fort Worth & Denver had to overcome.

(FW&D Series)

I need to mention that the utilization of the computer plays an ever-increasing role in maintenance of clearance data and in computing equivalent loadings, not just simply a "go" or "no-go."

(Slide series from the Santa Fe)

As mentioned earlier, cooperation from our member railroads in supplying information has been excellent. We have reports of loads of up to 262′10″ in length, 22′-3″ wide, combined center of gravity of 131″, and loads having a maximum gross weight of 1,575,000 pounds being moved by rail.

All of our roads are in the process of lessening some of the restrictions to oversized loads including removal of through trusses, grade separations, line changes, daylighting tunnels and widening cuts.

(Mini-series of slides depicting above)

In the amount of time left, let us view some interesting loads, some "close shaves," and special-type cars for handling special loads.

(Various clearance slides)

Yes, the challenges are bound to come. Ultimately, it will be the B&B people who will meet them. If you agree with me, say "Amen!"

Thank you.

President Sturm: Thank you Mr. Calhoun for a very interesting report.

Our final report will be the report of Special Committee No. 3 "Methods of Reducing Energy Consumption in Buildings." The sponsor of this committee, Mr. L. D. Green is unable to be with us. The Chairman will be introduced by the Special Subjects Committee Chairman, Mr. B. J. King.

(Mr. King introduces Mr. Saletnik)

Methods for Reducing Energy Consumption In Existing Buildings

REPORT OF SPECIAL COMMITTEE NO. 3

By PAUL H. SALETNIK

Asst. Building Engineer, Chicago & North Western

Acknowledgements

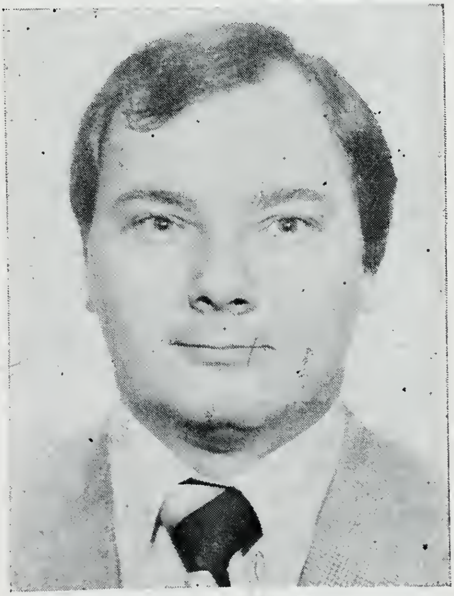
Since Mr. G. H. Manda is no longer railroad affiliated, I was asked to deliver this presentation. The bulk of the talk is essentially a revised version of Mr. Manda's rough draft presented to me approximately 2 months ago. I would like to acknowledge Mr. Manda's contribution and the members of Special Committee No. 3. Thank you all for your efforts.

I also would like to extend special thanks to the following people who provided me with information and slides in spite of such short notice:

Bill Russell, Wausau Metals Corp., Wausau, Wisconsin

George LaSalle & Ted Seep, BN, St. Paul, Minnesota

Hal Bowles, National Electrification Council, Washington, D.C.



Paul H. Saletnik

R. E. Smith, I.C.G., Chicago, Illinois
Lou Bolwahnn & Don Bessey, Milwaukee Road, Chicago, Illinois
R. C. McMaster, Bessemer & Lake Erie, Greenville, Pennsylvania
Ray Martens, Union Pacific, Omaha, Nebraska

Not many of you know that almost 6 years ago to the day, an event took place that would greatly alter just about all of our lives. The exact date was Oct. 17, 1973. Does anyone know what happened on that day?

Oct. 17, 1973 was the first day of a new age for anyone who had anything to do with the designing, building, or maintaining of any kind of new or existing building. It was the beginning of our current energy conservation awareness. It was the start of the first Arab oil boycott. And, in that year, the price of oil quadrupled!

Whether we admit it or not, from that day on, architecture and building management became branches of international politics and international economics.

That event and many other recent events have made us all acutely aware of the shortages of oil and natural gas not only in the U.S., but around the world. Scarcities of all sources of energy with resulting higher prices seem to be the only outlook for the future.

How much energy do we use?

The United States with only 6% of the world population each year consumes 35% of the total energy. (However, we also produce about 36% of the world's goods).

Americans use 72 quadrillion BTU's of energy per year. That is the equivalent of 2.9 billion tons of coal, or 633 billion gallons of oil or 72 trillion cubic feet of natural gas.

While this is true, the important question is what are the sources of our energy today and what will they be or should they be in the future?

The primary sources of all energy consumed in the U.S. presently are oil, natural gas, coal, nuclear and hydroelectric. The amount of energy consumed was equivalent to 75,561 trillion BTU's. The percentages of each used in 1973 are shown here.

(Today, coal and nuclear sources have increased slightly.)

The heavy emphasis on petroleum and natural gas (77.1%) is clearly indicated. Since our domestic production is far less than this it indicates our vulnerability to the effects of the world's energy markets.

How is it used?

1973 data from the Bureau of Mines shows transportation 30.2%, industrial 38.7%, with residential and commercial 30.75%.

The main consumer under the transportation heading is the automobile. Buildings are the prime consumers of the industrial, residential and commercial uses. This amounts to 69.45%—All for building related uses.

In a typical high rise office building 50% of the energy expended is for lighting, 20% for operating machinery, and 30% for heating and cooling.

In this age of manadatory energy efficiency, greater and greater non-mechanical control of the natural energy impinging on a building is a categorical imperative.

In winter the sun comes pouring in through the window and you love it! In summer it's liable to cost you. How do you maximize the positives and minimize the negatives? That's the question we all would like to have answered!

An energy efficient building must allow positive energy flow. That is—utilize natural energy instead of that which would have to be supplied mechanically. It must also inhibit negative energy flow. The transmission of energy into a building which needs mechanically supplied energy to counter its effects.

Heat, as you know, is transmitted in four ways: The first is **conduction.** Heat flowing through a building's skin from the high to the low temperature side.

The second is **convection.** Air movement on, around, and against the skin of a building that carries heat away with it.

The third is **radiation.** Heat being absorbed then being emitted by that object. That is—the transmission of heat by waves. Heat energy passes through the air between the source and the heated body without heating the intervening air.

The fourth is **infiltration.** Air leakage into a room or space through cracks around windows, under doors, etc. This movement always works against energy efficiency.

We must learn to control these to our advantage. We must interupt negative energy flow and maximize the positive flow.

With this in mind,—let's get to Mr. Manda's report:

The original committee topic was: "Methods For Reducing Energy Consumption in Buildings"

By utilizing both active and passive solar energy, or (in simple terms) just plain good energy conscious design, new construction offers many ways of conserving energy, which can be built into a building from the start. Since the majority of our problems are dealing with energy-wasting buildings built many years ago, this presentation will primarily be limited to the discussion of energy conservation in existing buildings.

Until recently, many people in the United States considered energy to be both inexhaustible and expendable, seemingly verified by the relatively low cost of most energy forms. Typically, buildings were designed and constructed primarily with initial costs in mind. The result has been the creation of a vast inventory of buildings which, by today's standards, utilize excessive amounts of energy.

It is fairly safe to say that buildings being designed now, and those to be designed in the future, will utilize many of the new techniques and systems which can lead to maximized energy efficiency. But, the present building inventory is being replaced at the rate of only 2-3% per year. As a result, the majority of existing buildings for many years to come will be those which were originally not designed with energy conservation in mind.

Because of this situation, conservation of energy in existing buildings has become a matter of very real concern.

Two approaches of energy conservation in use

The first method involves implementation of specific end-use restrictions in buildings, for example, adjustment of thermostats to specific levels to use less heating and cooling energy or removal of light bulbs and lamps to reduce consumption of lighting energy. Ease of initial implementation is the primary advantage of such an approach. After all, it requires very little new education or effort to lower a thermostat or remove a light bulb. Unfortunately, the end-use restriction method has numerous drawbacks.

Key among them is this: the extent to which a system is used has no bearing on its efficiency. If, for whatever reason, a system is inefficient, it will waste energy every time it is used. End-use restrictions tend to ignore the significant energy-savings which can be realized by making systems operate as efficiently as possible. In a similar manner, end-use restrictions fail to consider the fact that every building is a unique system whose many elements inter-relate. As a result, lowering a thermostat in winter can sometimes cause consumption of more energy, not less. (Cooling modes may be activated in the dead of winter.) Likewise, removing lamps and luminaires can sometimes cause consumption of energy sources which are in the shortest supply. (Heating systems can experience greater demand because the lighting system contributes to a building's source of heat.)

The second energy conservation approach is called "Total Energy Management," or TEM for short. In essence, TEM considers every building as a unique, complex system. To conserve energy, one first must understand how the building consumes energy; how users' needs are met; how the systems' elements interrelate; how the external environment affects it, and so on. By understanding how a specific building consumes energy, energy conservation improvements can be made which can be integrated into the system itself. Then, when the system is used, it runs efficiently and, therefore, uses the least amount of energy to get the job done.

Although the TEM approach is more versatile and effective than a concept which relies primarily on end-use restrictions, the latter has received far more attention.

Cooperation must be obtained

Assuming that you want to proceed toward development of a Total Energy Management program for your building or buildings, it will be necessary to obtain initial cooperation. This is needed not only to obtain the commitment and assistance required for initial tasks, but also to lay the foundation for the cooperation which will be needed in actual implementation of the full TEM program. As with any management endeavor, it is suggested strongly that maximum effectiveness of the overall approach can be obtained only when one executive is selected in the beginning to head the entire project. It should be his responsibility to coordinate investigation of possible conservation measures and their appropriate implementation.

You may find it advisable, once management cooperation and commitment are assured, to call together all staff personnel, including clerical assistants and operating and maintenance personnel. Explain the undertaking on which you are about to embark; the contribution which can be made to overall national goals of energy self-sufficiency, and the goals which can be achieved in terms of energy cost savings, and instill a sense of team spirit which can be invaluable in helping you achieve the goal of energy conservation through Total Energy Management.

Now I would like to discuss the specific method of reducing energy consumption in buildings. These following guidelines are set up into two categories, minimum expense and significant expense. First we have:

Interior space utilization

The way in which interior building space is utilized by occupants can have a pronounced effect on energy utilization as well as on business productivity. Some of the potentially beneficial modifications which should be considered include:

Work Method Improvements
Minimal Expense

a. Consider combining operations and work elements, changing sequence of operations, simplifying necessary operations, eliminating unnecessary work, and establishing preferred work methods. In this way, for example, trips between floors via the elevator can be reduced if several routine tasks can be undertaken while on the floor involved, instead of making two or three trips to perform each task separately.

Equipment and Materials Relocation
Minimal Expense

a. Consider locating all computer and computer type equipment, which requires close temperature and humidity control, in a common space to be served by a common system.

b. Where practical, place all heat producing equipment, such as duplicating machines, in one area to enable easier control for heating and cooling purposes.

Significant Expense

a. Consider removing partitions to create an open space effect which will permit much freer movement of air and a reduction in lighting requirements.

Infiltration

Unwanted outside air infiltrates into a building through inadvertent openings in the building envelope—open doors, etc. Since outdoor air, regardless of source, must be heated or cooled (and sometimes humidified and/or dehumidified), infiltration imposes a significant load on the heating and cooling system, increasing total energy consumption.

Windows and Skylights

Minimal Expense

a. Replace broken or cracked window panes.
b. Replace worn or broken weather-stripping around operable windows. If possible, install weather-stripping where none was installed previously.
c. Have an annual check up to caulk around window frames (exterior and interior) if cracks are evident.
d. Consider putting out a directive or posting a small sign next to each operable window, instructing occupants not to open windows while the building is being heated or cooled.
e. Consider installing automatic door closers on all doors leading to the exterior or unconditioned spaces.

The Bessemer & Lake Erie, in their Greenville, Pa. shops have replaced old glazed wooden window sash, (installed approximately in 1915) with fiber glass sandwich panels. The original windows had a U value of about 1.10 and the new fiber glass panels have a U value of around .4.

If maintaining good natural lighting is important, installing glass blocks instead gives you a U value of approximately .4 to .6 while still allowing plenty of light into your building.

Now, if you have a little more money to spend, you can do what the B.N. did at their Corporate Headquarters in St. Paul, Minnesota.

Their energy bill for this building was $70,000/month. They had to reduce energy costs!

In order to do so, they had to replace the single glazed, double-hung wooden windows. Air leakage was a tremendous problem. Not to mention the condensation problems.

They went about it in a very systematic way. Several window manufacturers were asked to install one of their windows as a sample. Then the B.N. hired a private testing firm to measure air infiltration, heat loss, sound transmission and many other important characteristics.

The window that won the competition is manufactured by Wausau metals of Wausau, Wisconsin.

The bottom sash is a pivoting double insulated window and the upper portion is an opaque fiberglass insulated panel.

Without a thermal barrier, you get a frost build-up.

Ventilation

Ventilation has significant impact on a building's total energy consumption. Each cubic foot of air brought into the building must be either heated or cooled and, in some cases, humidified and/or dehumidified. Guidelines for action are as follows:

Minimal Expense

a. Limit outdoor air to the minimum required to balance the exhaust requirements and maintain a slight positive pressure to retard infiltration.
b. Reduce or eliminate the need for using outdoor air for odor control by installing chemical or activated charcoal odor-absorbing devices.
c. Inspect filters carefully. Create a filter replacement schedule. Utilize high-efficiency, low-cost filters.
d. Close outdoor air dampers during the first and last hour of occupancy when the air must be heated or cooled.
e. Consider adding controls to shut down the ventilation system when-

ever the building is closed for an extended period of time or during the evening, weekends, etc.

f. Reduce volume of toilet exhausts in buildings which have multiple toilet exhaust fans having a total fan capacity in excess of outside air requirements. This can be done by wiring a fan interlock into toilet room light through a timed relay, so that fan is activated only when lights are on. An administrative request, plus signs to the effect that lights should be turned off when the room is not in use, will help ensure that lights (and thus the fan) are off when the room is not being used. Another method involves dampering down air volume so only that amount of air required by code is removed.

g. Install baffles to prevent wind from blowing directly into an outdoor air intake.

Significant Expense

a. Consider installing economizer enthalpy controls to air handling units in offices to minimize cooling energy required by using proper amounts of outdoor and return air to permit "free cooling" by outside air when possible.

b. When more than 10,000 C.F.M. is involved, and when building configuration permits, consider installation of heat recovery devices such as a rotary heat exchanger. For some climatic conditions an "enthalpy wheel," which permits recovery of some 75% of outdoor heat load during both heating and cooling cycles, will be feasible.

Transmission

Transmission losses generally can be reduced either through addition of insulation or modification of glazing characteristics.

Insulation

It is advised strongly that expert technical assistance be obtained before undertaking any insulating to help ensure that the proper type and correct amount are installed, that cost effectiveness will result, and that any potential problems—such as moisture condensation—can be avoided.

Minimal Expense

a. Where roof insulation is not practical, consider insulating the top floor ceiling. This can be done easily with blown insulation. In most cases, ceiling insulation also will require a vapor barrier placed on the warm side of the ceiling.

b. If remodeling or modernization is contemplated, consider adding insulation to all exterior walls as well as those which separate conditioned and nonconditioned spaces.

Significant Expense

a. Consider adding roof deck insulation to your building or sprayed-in-place urethane insulation. Be aware that most spray on foam insulations are highly flammable and emit highly toxic gases when burning. If you decide to use such insulations, be sure they are properly protected.

b. In new construction of buildings with slabs on grade always use plenty of perimeter insulation!

Glazing

In all cases, preferential treatment should be given to those windows most exposed to direct sunlight or high levels of reflected sunlight.

Minimal Expense

a. Inspect condition of indoor shading devices, such as draperies and blinds, which can reduce heat gain as much as 50%. Keep indoor shading devices clean and in good repair.

b. During the heating season, close all interior shading devices before leaving space to reduce night-time heat losses.

c. Use opaque or translucent insulating materials to block off and thermally seal all unused windows.

Significant Expense

a. Consider adding reflective and/or heat-absorbing film to glazing to reduce solar heat gains by as much as 80%. Do be aware that such films will reduce substantially the benefits of natural lighting. The Union Pacific has been using this type of film in many of their office buildings.

b. Consider adding reflective materials to the window side of draperies to reflect solar heat when draperies are drawn.

c. Install indoor shading devices where none now exist, even if exterior shading devices are used. They should be light-colored and opaque.

d. Consider installation of outdoor shading devices, such as sunshades, which reflect solar heat before it has a chance to enter the building, and which dissipate heat outdoors rather than indoors. Also, remember that adjustable sunshades enable entrance of warming rays during the heating season.

Windbreaks

Minimal Expense

a. If open space is available, consider planting trees or large shrubs to act as windbreaks on the windward side of the building. The windbreak can reduce wind impact, at least on lower floors. Trees and shrubs also can be used to reduce unwanted solar penetration, in summer months, and still allow the sun's rays to pass during the winter.

Heating and cooling

Heating and cooling together usually consume the largest single "block" of energy utilized by a building during the course of a year. In most cases, however, the heating/cooling system was designed only with initial costs in mind. As a result, the energy efficiency of the system seldom was part of the original design concept. The prime culprit of energy waste in many office buildings is the method in which the temperature is controlled. In the past, most systems controlled room temperature by varying the temperature of the air feeding the space. Today, by varying the volume of air—instead of the temperature—comfort can be achieved without wastefully operating both heating and cooling modes simultaneously. Moreover, most systems were designed to meet extreme conditions which possibly could occur, but which seldom do. Accordingly, many are over-sized and so perform in an inefficient manner.

Heating and cooling systems can be made more efficient in many ways.

Operating Practices Modifications (General)

Significant heating and cooling energy savings can be achieved simply by modifying the manner in which heating and cooling systems are operated.

While changes in operational procedures can save energy and energy costs, the net amount represents but a fraction of the potential which can be saved through other, more substantial measures. In other words, do not use operational savings as an excuse not to undertake other, potentially more beneficial measures.

Operational savings, will, in some cases, cause minor deviation from accepted standards of comfort. Some deviations may be more noticed than others. Professional assistance and guidance should be obtained before instituting any significant operational change. As an example, in certain situations setting a thermostat to 68 degrees during the heating season can cause the cooling system to be activated, wasting more energy than is conserved. Likewise, setting thermostats at 78°F during the cooling season can bring on heating or reheat.

Remember that each building comprises a unique situation. As such, the guidelines outlined herein should be recognized as general only. Each must be tailored for the building involved, preferably with professional guidance.

Here follow some of the guidelines for the more effective changes which can be made in operational routine to effect energy savings:

Minimal Expense

a. Reduce use of heating and cooling systems in spaces which are used infrequently or only for short periods of time.

b. Heat office building to 68°F when occupied, to 60° when unoccupied. This does not mean that air should be cooled if the temperature exceeds 68°F. Interior office spaces tend to experience significant heat gains due to lighting, equipment and people. Systems serving most areas use a combination of recirculated inside air and some outside air. As a result, the temperature may tend to stay at or above 68°F. Preheat building so that it achieves 65°F by the time occupants arrive. Complete warm-up during the first hour of occupancy. Lighting, people and use of equipment will aid in warm-up.

c. Turn heat off during last hour of occupancy.

d. Cool office building to 78°F when occupied.

e. Do not utilize mechanical cooling when unoccupied. Special consideration, however, must be given to computer rooms. Generally, the primary criterion is a constant temperature/humidity relationship. Manufacturers should be contacted to determine permissible ranges. Cooling usually is required when the equipment is operated, but should not be used to lower room temperature below the range of 78° - 80°F.

f. Begin precooling operations so the building is 5° below outside air temperature, or 80°F, whichever is higher, by the time occupants arrive. Complete cool-down during the first hour of occupancy.

g. Isolate storage room areas from work areas. Maintain storage areas at 60°F or lower in winter.

h. Consider closing outside air dampers during the first and last hours of occupancy and during peak loads.

i. During cooling season evening and night hours, flush the building with cooler outdoor air.

j. When appropriate, consider closing supply registers and radiators and reducing thermostat settings or turning off the electric heaters in lobbies, corridors and vestibules.

k. Where sill height electric heaters are used, adjust thermostat so heat provided is just sufficient to prevent cold downdrafts from reaching the floor.

l. Turn off humidifiers whenever the building is closed for extended periods of time, except when process or equipment requirements take precedence.

m. Curtail humidification for areas such as hallways, equipment rooms, lobbies and similar spaces.

In 1976 at the Milwaukee Road's Milwaukee, Wisconsin shops, the local gas company cut off their gas supply and forced them to burn fuel oil. Because of the higher costs of oil, the projected heating bill for the 76-77 season alone was estimated to be $500,000 higher than the 75-76 season. Every effort had to be made to reduce the use of steam to a minimum.

Unneeded steam transmission and condensate return lines had to be eliminated and necessary lines restored and heavily insulated.

A total energy management approach was utilized. (Careful studies were made). In addition to line repairs, areas not really needing heat were cut off, and remotely located buildings were provided with their own independent package boiler systems.

Because of these efforts, thousands of dollars were saved.

Domestic hot and cold water

Domestic hot water often consumes from 2% to 4% of the total energy used in large office buildings. Cold water, provided in drinking fountains, also is a factor in total building energy consumption. The following guidelines should be considered in an effort to conserve energy:

Minimal Expense

a. Inspect water supply system and repair all leaks, including those at the faucets.
b. Inspect and test hot water controls to determine if they are working properly. If not, either regulate, repair or replace.
c. Inspect insulation on storage tanks and piping. Repair or replace as needed.
d. Consider replacing existing hot water faucets with spray type faucets with restrictors where practical.
e. Consider installing spring-activated hot water taps.
f. If water pressure exceeds 40 to 50 pounds, consider having a plumber install a pressure reducing valve on the main service to restrict the amount of hot water that flows from the tap.
g. Reduce temperature levels to the minimum required for washing hands, usually about 90°F to 100°F. Boost hot water temperature locally for other areas where it is needed, rather than by providing higher temperatures for the entire building.
h. Consider relocating the water heater as close to the point of use as possible. The longer the run, the more hot water that sits in it—cooling down—between periods when hot water is drawn.
i. Consider replacing free running drinking fountains with spigot types which utilize a paper cup. Over half the water drawn by free-running fountains is wasted.

Lighting

Before undertaking any change, you must recognize that a lighting system is just that—a system. Its many elements are interrelated with one another, just as the lighting system itself is interrelated with other systems in the building. While energy can be conserved by properly removing lamps and luminaires, realize that such action should be taken only after the entire system has been analyzed and all options evaluated. While conservation of energy is important, it must be achieved in a manner consistent with other requirements, including those of productivity and visual comfort, aesthetics, federal, state and local codes and ordinances, etc. Moreover, it is especially important to recognize that major alterations to a lighting system can have a significant impact on heating and cooling systems, most of which were designed to consider the amount of heat given off by the lighting system as originally designed. For these reasons, it is suggested strongly that competent technical assistance be obtained before any significant modifications are made and that modifications be made only in full light of the building's illumination needs, the lighting systems which currently exists, and the many different options which can be utilized.

The following highlights many of the actions which should or can be taken to implement an effective program of lighting energy management.

Modify Usage Patterns

Minimal Expense

a. Establish an effective lighting usage program: a planned program to turn lights on when and where they are needed. The major advantages of such programs are that they can be tailored to the individual space and needs of its occupants, implemented relatively inexpensively, and implemented very quickly. The key element of a lighting usage program is a lighting schedule related to occupant usage patterns. Personnel should be assigned, trained and made responsible for the efficient utilization of lighting by means of established schedules for the control of lighting.

b. Campaign for better utilization by using letters, memos, signs and personal contact to encourage occupants to use lighting only when it is needed, to use only the amount of lighting required, and to turn off lights whenever they are not being used.

c. Post a small sign or chart near each switch which identifies which lights are controlled by the switch. This enables the user to be more selective while also reducing trial-and-error which can consume significant amounts of energy as banks of lights are quickly activated and deactivated.

Work Station Modifications

Work stations can be relocated to take maximum advantage of the lighting system which exists or to supplement or further facilitate changes to other elements of the system. Typical modifications to work station locations are as follows:

Minimal Expense

a. Move desks and other work surfaces to a position and orientation that will use installed luminaires to their greatest advantage (instead of moving luminaires).

b. To the extent permitted by productivity requirements and related concerns, group tasks which require approximately the same levels of illumination. Drafting rooms are a good example. This may reduce the number of areas requiring higher illumination levels and provide an opportunity to reduce the total amount of lighting needed.

c. Locate work stations requiring the highest illumination levels nearest the windows. Recognize that utilization of natural lighting will have an impact on heat gain; therefore, be certain that the heat gain/light gain trade-off be given careful consideration. In many cases glazing can be modified to limit heat gain while still permitting entry of a significant amount of light. Note: The lighting industry has recently developed a fiber optic operated ballast which further regulates the current to the light source and is controlled by the amount of available ambient light.

d. Arrange work surfaces so that sidewall daylighting crosses the task perpendicular to the line of vision.

Maintenance Considerations

Proper maintenance of lighting system components serves to keep the system running at peak efficiency. This not only conserves energy and energy costs, but also helps maintain quality illumination and extends lamp and luminaire life. The following maintenance considerations should be reviewed.

Minimal Expense

a. Lamp efficiency deteriorates over the life of a lamp. Light output should be checked regularly with a calibrated light meter by maintenance personnel. When the light output of a group of lamps has fallen to approximately 70% of the original light output, relamp all fixtures in the group at the same time. This is also a good time to check whether a more efficient or lower wattage lamp is suitable.

b. Lamps should be wiped clean at regular intervals to assure maximum efficiency.

c. Clean ceilings, walls and floors frequently to improve reflective qualities. When daylight is used, wash windows frequently to maintain illumination levels on tasks which require some natural illumination.

The Illuminating Engineering Society (IES), realizing the need for design practices concerning energy while maintaining light quality, offer 12 recommendations for the better utilization of lighting energy.

1) Design lighting for expected activity.
2) Design with more effective luminaires and fenestration.
3) Use efficient light sources. (Higher lumen/watt output)
4) Use more efficient luminaires.
5) Use thermal-controlled luminaires.
6) Use lighter finishes on ceilings, walks, floors, and furnishings.
7) Use efficient incandescent lamps.
8) Turn off lights when not needed.
9) Control window brightness.
10) Utilize daylighting as practicable.
11) Keep lighting equipment clean and in good working condition.
12) Post instructions covering operation and maintenance.

Practically all of the energy consumed by a lamp is dissipated as heat within the space.

Computer facilities

Recent research shows that buildings with significant computer installations frequently consume as much as 1.5 and more times the amount of energy consumed by buildings without such installations. While the computer equipment itself obviously consumes energy, researchers feel that the primary reason for the high energy consumption rate is the extent to which the computer support facilities and equipment are in use. Typically, computer operations extend into periods when a building would otherwise be unoccupied—evening, late evening, early morning, weekends, etc. In some cases computer operations continue around-the-clock. As a result, the building systems required to support computer equipment and personnel — HVAC, lighting, elevator, and other systems—also must be operational and so consume energy. Given the extensive amount of work performed by computers and those who man them, as well as their high rate of productivity, suggestions that their use be reduced to conserve energy would be out-of-the-question. Nonetheless, steps can be taken to at least ensure that no more energy than is necessary is used to support computer operations.

Minimal Expense

a. Consult manufacturers to determine permissible temperature and humidity ranges. Adjust controls of computer-support HVAC equipment to provide those conditions which are acceptable and which will result in the minimum expenditure of heating/cooling/humidification/dehumidification energy.
b. Reduce lighting levels to those minimums suggested by the computer equipment manufacturer.

Significant Expense

a. Modify the HVAC system to permit independent conditioning of air in computer rooms.
b. Modify the lighting system to provide proper illumination and selective control to enable energy savings particularly during extended periods of operation when the building otherwise would be unoccupied.
c. Consider installation of systems to recover heat produced by computer equipment and computer-area lighting for use elsewhere.

In conclusion, reducing energy consumption in buildings is a project that must have a total commitment from management, and, the education and assistance from all people, to make the program work. People must be aware of the importance of conserving energy and be willing to abide by the procedure set down by management. The end-use restrictions approach is only a start. It is essential that a total energy management procedure be implemented to produce the maximum effect in reducing energy.

If we just keep in mind the intent of this little sign "When not in use—turn off the Juice," we all will be headed in the right direction.

Thank you.

President Sturm: Thank you Mr. Saletnik for an excellent and timely report on a subject that is of great concern to everyone.

I am pleased to announce that as of this morning our total registration is 2452. This surpasses the previous high attendance of 2216 established in 1969.

CLOSING SESSION

This concludes our program for the 84th Annual Conference of the American Railway Bridge and Building Association. I am sure you will all agree that this meeting in Atlanta has been one of the finest in the history of our Association.

As I conclude my term as your president, I want to express my deep appreciation for the cooperation and support that I have received from the officers and directors of the Association, without whose dedication this conference would not have been possible. Also to our secretary and her assistant who handle the multitude of tasks necessary to operate this association. I am confident that the slate of officers you are about to elect will continue to provide the fine leadership that has characterized our Association.

Earlier you heard the report of the nominating committee: Any further nominations from the floor?

(Mr. D. Gould's Acceptance Speech at Annual Meeting in Atlanta)

I am honored to assume this responsibility of leadership for our Association. To me, this represents a high-point in my railroading career, and the by-product of a most enjoyable and informative membership in ARB&BA. I will make every effort to give the Association the fine guidance and administration it has traditionally received from my predecessors.

Speaking in behalf of the Association and myself, I want to thank ~~Wally Sturm~~ who has given generously of his time and been tireless in his effort to make this a most successful year and especially for the outstanding Conference we are concluding. On behalf of the Association, it gives me great pleasure to present this placque of recognition to you, Wally. (Pause for presentation). We will continue to benefit from Wally's experienced leadership as he continues to serve on the Executive Committee.

I want to congratulate our new vice-president Walt Hyma, and the Junior Directors P. H. Saletnik, D. A. Bessey and W. J. Gunkle. To our out-going Directors Jack King, Jim Robertson and Jim Budzelini, I thank you for your time, cooperation and guidance during your terms.

In the year ahead, the financial condition of our nation and the problems of the Railroad industry will demand that our working forces make every effort to stretch each dollar, obtain the highest man-hour production and carefully plan each endeavor. As we face these challenges, we will realize the importance of increasing our expertise, of exchanging ideas and solutions and using different methods and materials. These are the very benefits the "B&B" Association offers all of its members, and, around which, we plan our Annual Conference.

The ARB&BA is **your** organization. For a growing association, your participation is required. You all have valuable experience and leadership qualities which I am asking you to share with your organization as we develop an interesting and informative 1980 Conference program. Let me and your Association know of your problems and accomplishments—and come to the 1980 Conference to share your expertise. The Conference will be September 22-24 at the Hyatt Regency Chicago.

Does any one have any other matters which should be brought before this meeting?

(Pause)

I now declare the 84th Annual Conference of the American Railway Bridge & Building Association to be adjourned.

Will the members of the Executive Committee please assemble in the adjoining room for a short meeting?

Joe Chambers
Tim Budzileni
Jim Williams
Tim Davidson

Charley Russell
Jim Davidson
Jim Williams

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3rd V.-Pres.	Wm. S. Danes	A. Shane	A. Zimmerman	A. Zimmerman
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	H. D. Cleaveland	W. E. Smith	C. A. Lichty	W. O. Eggleston
	A. Montzheimer	. W. Merrick	W O. Eggleston	J. H. Markley

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	H. Rettinghouse	W. H. Finley	W. O. Eggleston	H. H. Eggleston
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	1911-1912	1912-1913	1913-1914	1914-1915
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4th V.-Pres.	T. J. Fullen	G. Aldrich	C. E. Smith	E. B. Ashby
Secretary	C. A. Lichty	C. A. Lichty	C. A. Lichty	C. A. Lichty
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	W. F. Steffens	C. E. Smith	Lee Jutton	F. F. Strouse
	E. B. Ashby	S. C. Tanner	W. F. Strouse	C. R. Knowles
	W. O. Eggleston	Lee Jutton	C. R. Knowles	A. Ridgway

	1915-1916	1916-1917	1917-1918	1918-1919
President	G. W. Rear	C. E. Smith	S. C. Tanner	Lee Jutton
1st V.-Pres.	C. E. Smith	E. B. Ashby	Lee Jutton	F. E. Weise
2nd V.-Pres.	E. B. Ashby	S. C. Tanner	F. E. Weise	W. F. Strouse
3rd V.-Pres.	S. C. Tanner	Lee Jutton	W. F. Strouse	C. R. Knowles
4th V.-Pres.	Lee Jutton	F. E. Weise	C. R. Knowles	A. Ridgway
Sec.-Treas.	C. A. Lichty	C. A. Lichty	C. A. Lichty	C. A. Lichty
Executive Members	F. E. Weise	W. F. Strouse	A. Ridgway	J. S. Robinson
	W. F. Strouse	C. R. Knowles	J. S. Robinson	J. P. Wood
	C. R. Knowles	A. Ridgway	J. P. Wood	A. B. McVay
	A. Ridgway	J. S. Robinson	D. C. Zook	J. H. Johnston
	J. S. Robinson	J. P. Wood	A. B. McVay	E. T. Howson
	J. P. Wood	D. C. Zook	J. H. Johnston	C. W. Wright

	1919-1920	1920-1921	1921-1922	1922-1923
President	F. E. Weise	W. F. Strouse	C. R. Knowles	Arthur Ridgway
1st V.-Pres.	W. F. Strouse	C. R. Knowles	A. Ridgway	J. P. Wood
2nd V.-Pres.	C. R. Knowles	A. Ridgway	J. S. Robinson	J. S. Robinson
3rd V.-Pres.	A. Ridgway	J. S. Robinson	J. P. Wood	C. W. Wright
4th V.-Pres.	J. S. Robinson	J. P. Wood	C. W. Wright	E. T. Howson
Sec.-Treas.	C. A. Lichty	C. A. Lichty	C. A. Lichty	C. A. Lichty
Asst. Sec.			F. E. Weise	F. E. Weise
Directors	J. P. Wood	C. W. Wright	E. T. Howson	F. C. Baluss
	A. B. McVay	A. B. McVay	J. H. Johnston	Maro Johnson
	J. H. Johnston	G. A. Manthey	E. K. Barrett	O. F. Dalstrom
	E. T. Howson	E. T. Howson	F. C. Baluss	S. D. Corey
	C. W. Wright	J. H. Johnston	Maro Johnson	W. B. Hotson
	G. A. Manthey	E. K. Barrett	O. F. Dalstrom	P. N. Nelson

	1923-1924	1924-1925	1925-1926	1926-1927
President	J. S. Robinson	J. P. Wood	C. W. Wright	E. T. Howson
1st V.-Pres.	J. P. Wood	C. W. Wright	E. T. Howson	F. C. Baluss
2nd V.-Pres.	C. W. Wright	E. T. Howson	F. C. Baluss	Maro Johnson
3rd V.-Pres.	E. T. Howson	F. C. Baluss	Maro Johnson	J. S. Huntoon
4th V.-Pres.	F. C. Baluss	Maro Johnson	J. S. Huntoon	C. S. Heritage
Sec.-Treas.	C. A. Lichty	C. A. Lichty	C. A. Lichty	C. A. Lichty
Asst. Sec.	F. E. Weise	F. E. Weise	F. E. Weise	F. E. Weise
Directors	S. T. Corey	J. S. Huntoon	C. S. Heritage	A. I. Gauthier
	W. B. Hotson	A. I. Gauthier	W. B. Hotson	E. L. Sinclair
	P. N. Nelson	E. L. Sinclair	P. N. Nelson	P. F. Dalstrom
	J. S. Huntoon	C. S. Heritage	A. I. Gauthier	W. T. Krausch
	A. I. Gauthier	W. B. Hotson	E. L. Sinclair	R. C. Bardwell
	E. L. Sinclair	P. N. Nelson	O. F. Dalstrom	H. I. Benjamin

	1927-1928	1928-1929	1929-1930	1930-1934
President	F. C. Baluss	Maro Johnson	J. S. Huntoon	C. S. Heritage
1st V.-Pres.	Maro Johnson	J. S. Huntoon	C. S. Heritage	A. I. Gauthier
2nd V.-Pres.	J. S. Huntoon	C. S. Heritage	A. I. Gauthier	H. I. Benjamin
3rd V.-Pres.	C. S. Heritage	A. I. Gauthier	H. I. Benjamin	W. T. Kransch
4th V.-Pres.	A. I. Gauthier	H. I. Benjamin	W. T. Krausch	T. H. Strate
Sec.-Treas.	C. A. Lichty	C. A. Lichty	C. A. Lichty	C. A. Lichty
Asst. Sec.	F. E. Weise	F. E. Weise		
Directors	W. T. Krausch	R. C. Henderson	G. A. Rodman	E. C. Neville
	R. C. Bardwell	J. S. Ekey	W. A. Batey	H. H. Best
	H. I. Benjamin	T. H. Strate	F. W. Hillman	J. E. King
	R. C. Henderson	G. A. Rodman	E. C. Neville	A. B. Scowden
	T. H. Strate	W. A. Batey	H. H. Best	W. A. Batey
	J. S. Ekey	F. W. Hillman	J. E. King	L. C. Smith

	1934-1935	1935-1936	1936-1937	1937-1938
President	H. I. Benjamin	T. H. Strate	E. C. Neville	C. M. Burpee
1st V.-Pres	T. H. Strate	E. C. Neville	C. M. Burpee	F. H. Masters
2nd V.-Pres	E. C. Neville	C. M. Burpee	F. H. Masters	W. S. Lacher
3rd V.-Pres	A. B. Scowden	F. H. Masters	C. A. J. Richards	C. A. J. Richards
4th V.-Pres	W. R. Roof	C. A. J. Richards	W. S. Lacher	F. H. Cramer
Sec.-Treas	C. A. Lichty	C. A. Lichty	C. A. Lichty	C. A. Lichty
Directors	C. M. Burpee	A. L. McCloy	W. R. Roof	B. R. Meyers
	W. A. Batey	R. P. Luck	T. P. Soule	G. S. Crites
	L. C. Smith	H. H. Best	F. H. Cramer	R. E. Dove
	C. A. J. Richards	W. R. Roof	B. R. Meyers	T. P. Soule
	A. L. McCoy	T. P. Soule	G. S. Crites	A. Chinn
	R. P. Luck	F. H. Cramer	R. E. Dove	L. G. Byrd

	1938-1939	1939-1940	1940-1941	1941-1942
President	Armstrong Chinn	A. E. Bechtelheimer	H. M. Church	R. E. Dove
1st V.-Pres	F. H. Cramer	F. H. Cramer	R. E. Dove	F. H. Soothill
2nd V.-Pres	A. E. Bechtelheimer	H. M. Church	F. A. Soothill	G. S. Crites
3rd V.-Pres	H. M. Church	R. E. Dove	G. S. Crites	A. M. Knowles
4th V.-Pres	R. E. Dove	F. H. Soothill	A. M. Knowles	N. D. Howard
Sec.-Treas	C. A. Lichty	C. A. Lichty		
Secretary	....	....	F. O. Whiteman	A. G. Shaver
Treasurer	....	....	F. E. Weise	F. E. Weise
Directors	L. G. Byrd	B. R. Meyers	N. D. Howard	R. E. Caudle
	W. R. Ganser	W. Walkden	L. G. Byrd	I. A. Moore
	F. H. Soothill	A. S. Krefting	K. L. Miner	W. A. Sweet
	B. R. Meyers	A. M. Knowles	R. E. Caudle	J. L. Varker
	W. Walkden	L. G. Byrd	I. A. Moore	L. E. Peyser
	A. S. Krefting	K. L. Miner	W. A. Sweet	Martin Meyer

	1942-1943	1943-1944	1944-1945	1945-1946
President	G. S. Crites	J. L. Varker	J. L. Varker	N. D. Howard
1st V.-Pres	R. E. Caudle	R. E. Caudle	R. E. Caudle	F. G. Campbell
2nd V.-Pres	A. M. Knowles	N. D. Howard	N. D. Howard	J. S. Hancock
3rd V.-Pres	N. D. Howard	F. G. Campbell	F. G. Campbell	E. H. Barnhart
4th V.-Pres	J. L. Varker	J. S. Hancock	J. S. Hancock	W. F. Martens
Secretary	A. G. Shaver† Lorene Kindred‡ Elinor V. Heffern	Elinor V. Heffern	Elise LaChance	Elise LaChance
Treasurer	F. E. Weise	C. R. Knowles	C. R. Knowles	C. R. Knowles
Treasurer Emeritus		F. E. Weise	F. E. Weise	
Directors	M. Meyer	W. F. Martens	W. F. Martens	A. B. Chapman
	L. E. Peyser	A. L. McCloy	A. L. McCloy	W. A. Huckstep
	K. L. Miner	L. C. Winkelhaus	L. C. Winkelhaus	F. R. Spofford
	F. G. Campbell	E. H. Barnhart	E. H. Barnhart	Guy E. Martin
	J. S. Hancock	A. B. Chapman	A. B. Chapman	B. R. Meyers
	L. C. Winkelhaus	L. E. Peyser	L. E. Peyser	L. E. Peyser

† To November 1, 1962 ‡ To February 1, 1943

	1946-1947	1947-1948	1948-1949	1949-1950
President	F. G. Campbell	J. S. Hancock	E. H. Barnhart	W. F. Martens
1st V.-Pres	J. S. Hancock	E. H. Barnhart	W. F. Martens	W. A. Huckstep
2nd V.-Pres	E. H. Barnhart	W. F. Martens	W. A. Huckstep	Guy E. Martin
3rd V.-Pres	W. F. Martens	W. A. Huckstep	Guy E. Martin	F. R. Spofford
4th V.-Pres	W. A. Huckstep	G. E. Martin	F. R. Spofford	Lee Mayfield
Treasurer	Elise LaChance	Elise LaChance	Elise LaChance	Elise LaChance
Treasurer	C. R. Knowles	C. R. Knowles	L. C. Winkelhaus	L. C. Winkelhaus
Directors	Guy E. Martin	H. M. Harlow	Lee Mayfield	H. M. Harlow
	B. R. Meyers	H. B. Christianson	F. M. Misch	V. E. Engman
	L. E. Peyser	F. R. Spofford	W. D. Gibson	G. W. Benson
	H. M. Harlow	Lee Mayfield	H. M. Harlow	F. M. Misch
	H. B. Christianson	Franz M. Misch	V. E. Engman	L. R. Morgan
	F. R. Spofford	W. D. Gibson	G. W. Benson	J. A. Jorlett

	1950-1951	1951-1952	1952-1953	1953-1954
President	W. A. Huckstep	Guy E. Martin	F. R. Spofford	Lee Mayfield
1st V.-Pres	Guy E. Martin	F. R. Spofford	Lee Mayfield	H. M. Harlow
2nd V.-Pres	F. R. Spofford	Lee Mayfield	H. M. Harlow	J. A. Jorlett
3rd V.-Pres	Lee Mayfield	H. M. Harlow	J. A. Jorlett	R. R. Gunderson
4th V.-Pres	H. M. Harlow	J. A. Jorlett	R. R. Gunderson	W. H. Huffman
Secretary	Elise LaChance	Elise LaChance	Elise LaChance	Elise LaChance
Treasurer	L. C. Winkelhaus	L. C. Winkelhaus	L. C. Winkelhaus	L. C. Winkelhaus
Directors	F. M. Misch	M. H. Dick	W. H. Huffman	M. H. Dick
	L. R. Morgan	R. R. Gunderson	L. R. Morgan	J. F. Warrenfells
	J. A. Jorlett	J. F. Warrenfells	B. M. Stephens	G. Switzer
	M. H. Dick	W. H. Huffman	M. H. Dick	B. M. Stephens
	R. R. Gunderson	L. R. Morgan	J. F. Warrenfells	W. H. Bunge
	J. F. Warrenfells	B. M. Stephens	G. Switzer	E. R. Schlaf

	1954-1955	1955-1956	1956-1957	1957-1958
President	H. M. Harlow	J. A. Jorlett	R. R. Gunderson	W. H. Huffman
1st V.-Pres.	J. A. Jorlett	R. R. Gunderson	W. H. Huffman	M. H. Dick
2nd V.-Pres.	R. R. Gunderson	W. H. Huffman	M. H. Dick	B. M. Stephens
3rd V.-Pres.	W. H. Huftman	M. H. Dick	B. M. Stephens	H. D. Curie
4th V.-Pres.	M. H. Dick	B. M. Stephens	H. D. Curie	
Secretary	Elise LaChance	Elise LaChance	Elise LaChance	Elise LaChance
Treasurer	L. C. Winkelhause	L. C. Winkelhaus	L. C. Winkelhaus	L. C. Winkelhaus
Directors	B. M. Stephens	J. F. Warrenfells	W. H. Bunge	G. W. Benson
	W. H. Bunge	H. D. Curie	E. R. Schlaf	J. M. Lowry
	E. R. Schlaf	J. M. Lowry	G. W. Benson	H. H. Matthews
	J. F. Warrenfells	W. H. Bunge	J. M. Lowry	T. M. von Sprecken
	H. D. Curie	E. R. Schlaf	T. M. von Sprecken	W. H. Bunge
	J. M Lowry	G. W. Benson	H. A. Matthews	E. R. Schlaf

	1958-1959	1959-1960	1960-1961	1961-1962
President	M. H. Dick	B. M. Stephens	H. D. Curie	G. W. Benson
1st V.-Pres.	B. M. Stephens	H. D. Curie	G. W. Benson	J. M. Lowry
2nd V.-Pres.	H. D. Curie	G. W. Benson	J. M. Lowry	E. R. Schlaf
3rd V.-Pres.	G. W. Benson	J. M. Lowry	E. R. Schlaf	H. A. Matthews
Secretary	Ruth Weggeberg	Ruth Weggeberg	Ruth Weggeberg	Ruth Weggeberg
Treasurer	L. C. Winkelhaus	L. C. Winkelhause	L. C. Winkelhaus	L. C. Winkelhause
Directors	J. M. Lowry	W. H. Bunge	H. A. Matthews	R. C. Baker
	R. C. Baker	E. R. Schlaf	M. J. Hubbard	R. H. Miller
	W. H. Bunge	H. A. Matthews	R. C. Baker	Shirley White
	E. R. Schlaf	M. J. Hubbard	R. H. Miller	H. M. Wilson
	H. A. Matthews	R. C. Baker	Shirley White	R. D. Hellweg
	M. J. Hubbard	R. H. Miller	H. M. Wilson	F. W. Hutcheson

	1962-1963	1963-1964	1964-1965	1965-1966
President	J. M. Lowry	E. R. Schlaf	R. C. Baker	H. M. Wilson
1st V.-Pres.	E. R. Schlaf	R. C. Baker	H. M. Wilson	R. D. Hellweg
2nd V.-Pres.	H. A. Matthews	Shirley White	R. D. Hellweg	J. W. DeValle
3rd V.-Pres.	R. C. Baker	H. M. Wilson	J. W. DeValle	W. F. Armstrong
Secretary	Ruth Weggeberg	Ruth Weggeberg	Ruth Weggeberg	Ruth Weggeberg
Treasurer	L. C. Winkelhaus	E. F. Snyder	E. F. Snyder	E. F. Snyder
Directors	Shirley White	R. D. Hellweg	W. F. Armstrong	J. A. Goforth
	H. M. Wilson	F. W. Hutcheson	J. S. Ellis	E. R. Simmons
	R. D. Hellweg	W. F. Armstrong	J. A. Goforth	N. D. Bryant
	F. W. Hutcheson	J. W. DeValle	E. R. Simmons	A. R. Dahlberg
	W. F. Armstrong	J. A. Goforth	N. D. Bryant	J. S. Ellis
	J. W. DeValle	E. R. Simmons	A. R. Dahlberg	T. L. Fuller

	1966-1967	1967-1968	1968-1969	1969-1970
President	R. D. Hellweg	J. W. DeValle	W. F. Armstrong	J. A. Goforth
1st V.-Pres.	J. W. DeValle	W. F. Armstrong	J. A. Goforth	A. R. Dahlberg
2nd V.-Pres.	W. F. Armstrong	J. A. Goforth	A. R. Dahlberg	T. L. Fuller
3rd V.-Pres.	J. A. Goforth	A. R. Dahlberg	T. L. Fulle	N. D. Bryant
Secretary	Ruth Weggeberg	Ruth Weggeberg	Ruth Weggeberg	Ruth Weggeberg
Treasurer	W. H. Huffman	W. H. Huffman	W. H. Huffman	W. H. Huffman
Directors	N. D. Bryant	J. S. Ellis	N. F. Lucas	W. H. Rankin
	A. R. Dahlberg	T. L. Fuller	W. L. Short	E. E. Runde
	H. F. Lucas	R. A. Youngblood	C. E. Wachter	T. A. Reynolds
	J. S. Ellis	H. F. Lucas	A. C. Jones	J. J. Ridgeway
	T. L. Fuller	W. L. Short	W. H. Rankin	J. R. Williams
	R. A. Youngblood	C. E. Wachter	E. E. Runde	J. W. Chambers
	V. D. Raessler	A. C. Jones	T. A. Reynolds	R. E. Frame
	W. L. Short	W. H. Rankin	J. J. Ridgeway	J. C. Hobbs
	C. E. Wachter	E. E. Runde	J. R. Williams	

	1970-1971	1971-1972	1972-1973	1973-1974
President	A. R. Dahlberg	T. L. Fuller	N. D. Bryant	E. E. Runde
1st V.-Pres.	T. L. Fuller	N. D. Bryant	E. E. Runde	J. J. Ridgeway
2nd V.-Pres.	N. D. Bryant	E. E. Runde	J. J. Ridgeway	J. R. Williams
3rd V.-Pres.	E. E. Runde	J. J. Ridgeway	J. R. Williams	W. R. Rankin
Secretary	Ann Wilson	Ann Wilson	Ann Wilson	Ann Wilson
Treasurer	W. H. Huffman	W. H. Huffman	W. H. Huffman	W. H. Huffman
Directors	T. A. Reynolds	J. W. Chambers	R. K. Corbett	D. C. Gould
	J. J. Ridgeway	R. E. Frame	J. R. Iwinski	W. S. Stokely
	J. R. Williams	J. C. Hobbs	J. S. Pritchett	W. C. Sturm
	J. W. Chambers	R. K. Corbett	D. C. Gould	J. W. Davidson
	R. E. Frame	J. R. Iwinsky	W. S. Stokeley	C. A. Hughes
	J. C. Hobbs	J. S. Pritchett	W. C. Sturm	W. R. Hyma
	R. K. Corbett	D. C. Gould	J. W. Davidson	O. C. Denz
	J. R. Iwinsky	W. S. Stokeley	C. A. Hughes	R. C. McMaster
	J. S. Pritchett	W. C. Sturm	W. R. Hyma	W. E. Brakensiek

	1974-1975	1975-1976	1976-1977	1977-1978
President	J. J. Ridgeway	J. R. Williams	W. H. Rankin	J. R. Iwinski
1st V.-Pres.	J. R. Williams	W. H. Rankin	J. R. Iwinski	W. C. Sturm
2nd V.-Pres.	W. H. Rankin	J. C. Hobbs	W. C. Sturm	D. C. Gould
3rd V.-Pres.	J. C. Hobbs	J. R. Iwinski	D. C. Gould	J. W. Chambers
Secretary	Ann Wilson	Ann Wilson	Ann Wilson	Ann Wilson
Treasurer	W. H. Huffman	W. H. Huffman	W. H. Huffman	W. H. Huffman
Directors	J. W. Davidson	W. E. Brakensiek	J. W. Chambers	W. J. Gunkle
	C. A. Hughes	O. C. Denz	M. Noyszewski	W. E. Halley
	W. R. Hyma	R. C. McMasters	W. J. Gunkle	K. L. Wammell
	W. E. Brakensiek	F. R. Lindsay	W. E. Halley	J. Budzileni
	O. C. Denz	M. Noyszewski	K. L. Wammel	B. J. King
	R. C. McMasters	W. C. Sturm	J. Budzileni	J. G. Robertson
	F. B. Lindsay, Jr.	W. J. Gunkle	B. J. King	O. C. Denz
	M. Noyszewski	W. E. Halley	J. G. Robertson	E. C. Patterson
	Jim Payne	K. L. Wammel		W. S. Stokely

	1978-1979
President	W. C. Sturm
Sr. V.-Pres.	D. C. Gould
Jr. V.-Pres.	J. W. Chambers
Jr. V.-Pres.	R. C. McMaster
Secretary	Ann Wilson
Treasurer	W. F. Armstrong
Directors	J. Budzileni
	B. J. King
	J. G. Robertson
	O. C. Denz
	E. C. Patterson
	W. S. Stokely
	L. D. Green
	C. M. Russell
	J. M. Williams

HISTORICAL INFORMATION

List of Annual Conventions

No.	Place of Meeting	Date	Membership
1	St. Louis, Mo.	Sept. 25, 1891	60
2	Cincinnati, Ohio	Oct. 18-19, 1892	112
3	Philadelphia, Pa.	Oct. 17-19, 1893	128
4	Kansas City, Mo.	Oct. 16-18, 1894	115
5	New Orleans, La.	Oct. 15-16, 1895	122
6	Chicago, Ill.	Oct. 20-22, 1896	140
7	Denver, Colo.	Oct. 19-21, 1897	127
8	Richmond, Va.	Oct. 18-19, 1898	148
9	Detroit, Mich.	Oct. 17-19, 1899	148
10	St. Louis, Mo.	Oct. 16-18, 1900	143
11	Atlanta, Ga.	Oct. 15-17, 1901	171
12	Minneapolis, Minn.	Oct. 21-23, 1902	195
13	Quebec, Canada	Oct. 20-22, 1903	223
14	Chicago, Ill.	Oct. 18-20, 1904	293
15	Pittsburgh, Pa.	Oct. 17-19, 1905	313
16	Boston, Mass	Oct. 16-18, 1906	340
17	Milwaukee, Wis.	Oct. 15-17, 1907	341
18	Washington, D. C.	Oct. 20-22, 1908	368
19	Jacksonville, Fla.	Oct. 19-21, 1909	393
20	Denver, Colo.	Oct. 18-20, 1910	428
21	St. Louis, Mo.	Oct. 17-19, 1911	499
22	Baltimore, Md.	Oct. 15-17, 1912	524
23	Montreal, Quebec	Oct. 21-23, 1913	570
24	Los Angeles, Cal.	Oct. 20-22, 1914	586
25	Detroit, Mich.	Oct. 19-21, 1915	665

No.	Place of Meeting	Date	Membership
26	New Orleans. La.	Oct. 17-19, 1916	710
27	Chicago, Ill.	Oct. 16-18, 1917	704
28	Chicago, Ill.	Oct. 15-17, 1918	716
29	Cleveland, Ohio	Oct. 21-23, 1919	776
30	Atlanta, Ga.	Oct. 26-28, 1920	840
31	New York, N. Y.	Oct. 18-20, 1921	850
32	Cincinnati, Ohio	Oct. 17-19, 1922	865
33	Seattle, Wash.	Oct. 16-18, 1923	846
34	Kansas City, Mo.	Oct. 21-23, 1924	837
35	Buffalo, N. Y.	Oct. 20-22, 1925	759
36	Richmond, Va.	Oct. 12-14, 1926	750
37	Minneapolis, Minn.	Oct. 18-20, 1927	754
38	Boston, Mass.	Oct. 23-25, 1928	755
39	New Orleans, La.	Oct. 15-17, 1929	755
40	Louisville, Ky.	Oct. 21-23, 1930	713
41	Chicago, Ill.	Oct. 16-18, 1934	592
42	Chicago, Ill.	Oct. 15-17, 1935	547
43	Chicago, Ill.	Oct. 20-22, 1936	588
44	Chicago, Ill.	Oct. 19-21, 1937	566
45	Chicago, Ill.	Oct. 18-20, 1938	589
46	Chicago, Ill.	Oct. 17-19, 1939	546
47	Chicago, Ill.	Oct. 15-17, 1940	610
48	Chicago, Ill.	Oct. 14-16, 1941	594
49	Chicago, Ill.	Oct. 20-22, 1942	618
50	Chicago, Ill.	Oct. 20-21, 1943	597
51	Chicago, Ill.	Sept. 17-19, 1946	698
52	Chicago, Ill.	Sept. 16-18, 1947	651
53	Chicago, Ill.	Sept. 20-22, 1948	652
54	Chicago, Ill.	Sept. 12-14, 1949	676
55	Chicago, Ill.	Sept. 18-20, 1950	713
56	Chicago, Ill.	Sept. 17-19, 1951	676
57	Chicago, Ill.	Sept. 15-17, 1952	667
58	Chicago, Ill.	Sept. 15-17, 1953	666
59	Chicago, Ill.	Sept. 13-15, 1954	682
60	Chicago, Ill.	Sept. 19-21, 1951	625
61	Chicago, Ill.	Sept. 18-20, 1956	657
62	Chicago, Ill.	Sept. 23-25, 1957	769
63	Chicago, Ill.	Sept. 15-17, 1958	828
64	Chicago, Ill.	Sept. 15-17, 1959	863
65	Chicago, Ill.	Sept. 19-21, 1960	932
66	Chicago, Ill.	Sept. 18-20, 1961	968
67	Chicago, Ill.	Sept. 10-12, 1962	942
68	Chicago, Ill.	Oct. 14-16, 1963	887
69	Chicago, Ill.	Sept. 14-16, 1964	860
70	Chicago, Ill.	Sept. 13-15, 1965	829
71	Chicago, Ill.	Sept. 26-28, 1966	800
72	Chicago, Ill.	Oct. 11-13, 1967	799
73	Chicago, Ill.	Sept. 9-11, 1968	825
74	Chicago, Ill.	Sept. 9-11, 1969	746
75	Chicago, Ill.	Sept. 28-30, 1970	709
76	Chicago, Ill.	Sept. 13-15, 1971	719
77	Chicago, Ill.	Sept. 18-20, 1972	706
78	Chicago, Ill.	Sept. 17-19, 1973	750
79	Chicago, Ill.	Oct. 1- 3, 1974	683
80	Chicago, Ill.	Sept. 15-17, 1975	672
81	Chicago, Ill.	Sept. 13-15, 1976	674
82	Chicago, Ill.	Sept. 26-28, 1977	670
83	Chicago, Ill.	Sept. 18-20, 1978	663
84	Atlanta, Ga.	Oct. 15-18, 1979	642

CONSTITUTION

ARTICLE I.

NAME

Section 1. This association shall be known as the American Railway Bridge & Building Association.

ARTICLE II.

OBJECT

Section 1.** The object of this association shall be the advancement of knowledge pertaining to the design, construction and maintenance of railway bridges, buildings, water service facilities, and other structures, by investigation, reports and discussions.

Section 2. The association shall neither indorse nor recommend any particular devices, trade marks or materials, nor will it be responsible for any opinions expressed in papers, reports or discussion unless the same have received the endorsement of the association in regular session.

ARTICLE III.

MEMBERSHIP

Section 1.* The membership of this association shall be divided into four classes, viz: Members, life members, associate members and honorary members.

Section 2.* A member shall be a person in a position above rank of gang foreman in connection with engineering, construction and maintenance for railway bridges, buildings and water service facilities: or in the employ of a public regulatory body, a professor of engineering or architecture, a technical editor, a government or private timber expert, a consulting engineer, or an engineer in his employ, engaged in the engineering, construction and maintenance of railroad-related facilities or an engineer employed by a technical service or research and development organization, an officer or engineer of an engineering or scientific society or association whose aims and objectives are compatible with the aims and objectives of this association. Any person desirous of becoming a member shall make application upon the form prescribed by the executive committee, setting forth his name, age, residence and practical experience. He shall furnish at least three references to whom he is personally known. Applicants may be voted into membership at any regular executive meeting or by letter ballot of the executive committee, a majority vote being necessary in either instance.

Section 3.** To be eligible for a life membership a member must have belonged to the association for at least 15†† years and in general must have retired from active railway service due to age or physical disability. He shall have all the privileges of membership, except the holding of office, and shall not be required to pay annual dues. The transfer from membership to life membership shall be made in the same manner as the election of members, as prescribed in Section 2, of this Article.

Section 4. Associates shall be responsible persons who are not eligible as members, whose pursuits or attainments qualify them to co-operate with members in the study and development of improved practices in the construction and maintenance of bridges, buildings and water facilities. They shall have all the rights of members except of voting and holding office. They shall be elected in the manner prescribed for members, in Section 2 of this Article.

Section 5. Honorary members shall be chosen from persons who have attained acknowledged eminence in some branch of engineering or railway service. Their number shall be limited to ten. Honorary members shall be proposed by not less than six active members and shall be elected by the unanimous vote of the members present at a regular meeting. They shall have all the rights of members except that of holding office and shall be exempt from the payment of dues.

Section 6. Any member guilty of conduct unbecoming to a railroad officer and a member of this association, or who shall refuse to comply with the rules of this association, shall forfeit his membership on a two-thirds vote of the executive committee.

---

*Amended September, 1976.

** Amended September 20, 1948

†† Amended March 10, 1958.

Section 7. Membership shall continue until written resignation is received by the secretary, unless member has been previously expelled, or dropped for non-payment of dues in accordance with Section 1 of Article VII.

Section 8.** Only members shall hold office in this association, and only members and life members shall be entitled to vote in the election of officers.

ARTICLE IV.

OFFICERS

Section 1‡‡. The officers of the Association shall be a President, two Junior Vice Presidents, a Senior Vice President, a Secretary, a Treasurer and nine Directors, who, with the most recent Past President, shall constitute the Executive Committee.

Section 2. The past presidents of this association, previous to the most recent past president, who continue to be members shall be privileged to attend all meetings of the executive committee, at which meetings they shall receive due notice, and be permitted to discuss all questions and to aid said committee by their advice and counsel; but said past presidents shall not have a right to vote, unless called upon to fill a quorum.

Section 3. Vacancies in any office shall be filled for the unexpired term by the executive committee without delay.

ARTICLE V.

EXECUTIVE COMMITTEE

Section 1.** The executive committee shall manage the affairs of the association and shall have full power to control and regulate all matters not otherwise provided for in the constitution and by-laws and shall exercise general supervision over the financial interests of the association, and make all necessary purchases and contracts required to conduct the general business of the association, but shall not have the power to render the association liable for any debt beyond the amount then in the treasury plus accounts receivable and not subject to other prior liabilities. All appropriations for special purposes must be acted upon at a regular meeting of the association.

Section 2. Meetings of the executive committee may be called by a majority of the members of the committee, providing 10 days' notice is given members by mail.

Section 3. Five members of the executive committee shall constitute a quorum for the transaction of business.

ARTICLE VI.

ELECTION OF OFFICERS AND TENURE OF OFFICE

Section 1. Except as otherwise provided the officers shall be elected at the regular annual meeting of the association and the election shall not be postponed except by unanimous consent of the members present at said annual meeting. The election shall be by ballot, a majority of the votes cast being required for election. Any member of the association not in arrears for dues shall be eligible for office, but the president shall not be eligible for re-election.

Section 2‡‡. The President, two Junior Vice Presidents, Secretary, and Treasurer shall hold office for one year and the Directors for three years; three Directors being elected each year. The Senior Vice President shall hold office for one year and ascend to the office of President at the expiration of such service. All officers shall retain their office until their successors are elected and installed. A Director elected for a three-year term shall not be eligible to serve two consecutive terms.

Section 3.† The term of office of the secretary and the treasurer may be terminated at any time by a two-thirds vote of the executive committee. Their compensation shall be fixed by a majority vote of the executive committee.

The secretary shall also serve as secretary of the executive committee.

Section. 4. The secretary and the treasurer shall be required to give bond in an amount to be fixed by the executive committee.

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* Amended October 16, 1941.

† Amended September 21, 1957.

§ Amended September 28, 1966.

‡‡ Amended September 20, 1978

ARTICLE VII.

MEMBERSHIP FEE AND DUES

Section 1.[†] Every member upon joining this association shall pay to the secretary an entrance fee and dues as prescribed by the executive committee. No member in arrears for annual dues shall be entitled to vote at any election and any member more than one year in arrears, may be stricken from the list of members at the discretion of the executive committee.

Section 2.[‡] A person stricken from the list of members because of non-payment of dues, upon written application may be reinstated as a member in his former class without loss of privileges, either upon payment of all back dues (which must accompany applicants) or at the discretion of the executive committee voting in the manner prescribed in Section 2, Article III.

ARTICLE VIII.[*]

LOCAL SECTIONS

Section 1.[**] Upon the application of ten or more members of the association residing in the same geographical district, or having offices therein, the executive committee shall organize a local section for that district, to which all members in that district shall be eligible. Such local section shall admit to active membership only members in good standing. It shall hold not less than two meetings each year, and shall be governed by such constitution and by-laws not inconsistent with the constitution of this association as the section membership may adopt and the executive committee approve.

Section 2. The parent association shall not be put under any obligation, either financial or in the matter of policy or opinion, by any local section.

ARTICLE IX.

AMENDMENTS

Section 1. This constitution may be amended at any regular meeting by a two-thirds vote of the members present, provided that notice of the proposed amendment or amendments has been sent to the members at least 30 days previous to said regular meeting.

By-Laws

TIME OF MEETING

1.[**] The regular meeting of this association shall convene annually during the month of September, the exact date to be fixed by the executive committee.

PLACE OF MEETING

2.[**] The place of holding the annual convention shall be Chicago, Ill.

3. It shall be within the power of the executive committee to change the location or time of the meeting if it becomes apparent that it is for the best interests of the association.

QUORUM

4. At the regular meeting of the association, 15 or more members shall constitute a quorum.

[***]DUES

5. The annual dues for the fiscal year ending August 31, and payable in advance, shall be as follows:[*]

Members, $7.00; Associate Members, $7.00.

DUTIES OF OFFICERS

6.[†] The president shall have general supervision over the affairs of the association. He shall preside at all meetings of the association and of the executive committee; shall appoint all committees not otherwise provided for, and shall be ex-officio member of all committees. He shall with the secretary sign all contracts or other written obligations of the association which have been approved by the executive committee. He shall render a detailed report at least three times during the year to the members of the executive committee, showing the financial condition of the association and its activities.

[†] Amended October 17, 1940.

[*] Article adopted 1922.

[**] Amended September 20, 1948

[‡] Amended September 21, 1957.

[***] Amended September 15, 1965.

At the annual meeting the president shall present a report containing a statement of the general conditions of the association.

7.‡‡ The Vice-Presidents in order of seniority shall preside at meetings in the absence of the President and discharge his duties in case of a vacancy in his office. The Senior Vice President shall have the senior position of Vice Presidents.

8.† It shall be the duty of the secretary to keep a correct record of the proceedings of all meetings of this association, and of all accounts, between this association and its members; to collect all moneys due the association, and deposit the same in the name of the association. He shall pay all bills when properly certified and approved by the president and the treasurer, and make such reports as may be called for by the executive committee. He shall also perform such other duties as the association may require.

9.‡ The treasurer shall have charge of the funds, check all deposits as made by the secretary, sign all checks after they have been approved by the president, and invest all funds not needed for current expenses as directed by the executive committee. He shall report at each annual meeting on the condition of the finances.

NOMINATING COMMITTEE

10.# After each annual meeting the president shall appoint a committee consisting of five members. Two Past Presidents shall be members of this committee, one of whom shall act as Chairman. No other officers of the Association shall be appointed to this committee. This committee shall prepare a list of names of nominees for officers to be voted on at the next annual convention in accordance with ARTICLE VI of the Constitution, said list to be read at the business session of said convention. Nothing in this section shall be construed to prevent any member making further nominations.

AUDITING COMMITTEE

11.‡ Prior to each annual meeting the president shall appoint a committee of three members, not officers of the association, whose duty it shall be to examine the accounts and vouchers of the secretary and the treasurer and certify as to the correctness of their accounts.

COMMITTEE ON SUBJECTS FOR DISCUSSION

12. After each annual meeting the president shall appoint a committee whose duty it shall be to prepare a list of subjects for investigation to be submitted for approval at the next convention.

COMMITTEE ON INVESTIGATION

13. After the association has adopted the list of subjects for investigation the president for the succeeding year shall appoint the committees who shall prepare the subjects for report and discussion. He may also appoint individual members to prepare reports on special subjects, or to report on any special or particular subject.

PUBLICATION COMMITTEE

14. After each annual meeting the executive committee shall appoint a publication committee consisting of three active members whose duty it shall be to cooperate with the secretary in the issuing of the publications of the association. The assignment of this committee shall be such that at least one member shall have served on the committee during the previous year.

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‡ Adopted October 17, 1940.
# Amended December 4, 1950.
† Amended September 20, 1948.
‡ Amended September 21, 1957.
‡‡ Amended September 20, 1978

ORDER OF BUSINESS

15.† Call to order by president.
Opening prayer or invocation.
President's address.
Report of secretary.
Report of treasurer.
Appointment of special committees.
Reports of standing committees and presentation of papers.
Unfinished business.
New business.
Election of officers.
Installation of officers.
Adjournment.

DECISIONS

16. The votes of a majority of the members present shall decide any questions. motion or resolution which shall be brought before the association, unless otherwise provided. Unless specifically provided herein otherwise, all discussions shall be governed by Robert's rules of order.

AMENDMENTS

17.† The By-Laws can be amended by a two-thirds vote of those present at any regularly called executive committee meeting.

---

† Amended September 20, 1948.

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Dove, R. E.
Gunderson, R. R.
Howard, N. D.
Huffman, W. H.
Jorlett, J. A.
Schlaf, E. R.
Winkelhaus, L. C.

LIFE MEMBERS

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Baker, F. A.
Barsema, M.
Beaver, J. F.
Bell, D. V.
Beringer, M. A.
Bishop, D. B.
Boehling, H. A., Jr.
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Bradfield, R. G.
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Burpee, C. M.
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Carter, J. W.
Celander, H. W.
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Christianson, H. B.
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Cooper, S. A.
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Fort, O. E.
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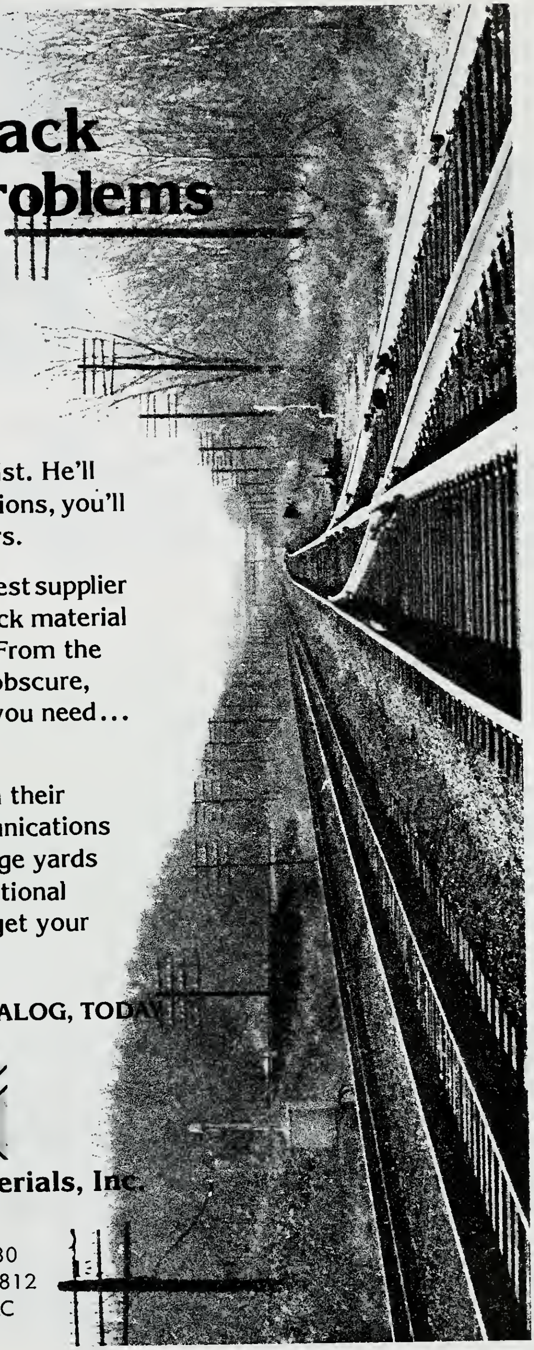

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M Indicates Member
A ″ Associate Member
L ″ Life Member
H ″ Honorary Member

(Figures following name indicate year in which membership became effective)

A

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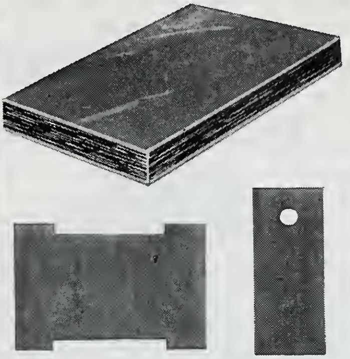

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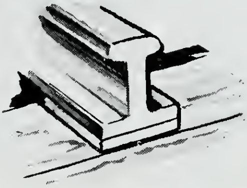

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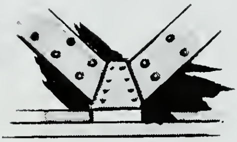

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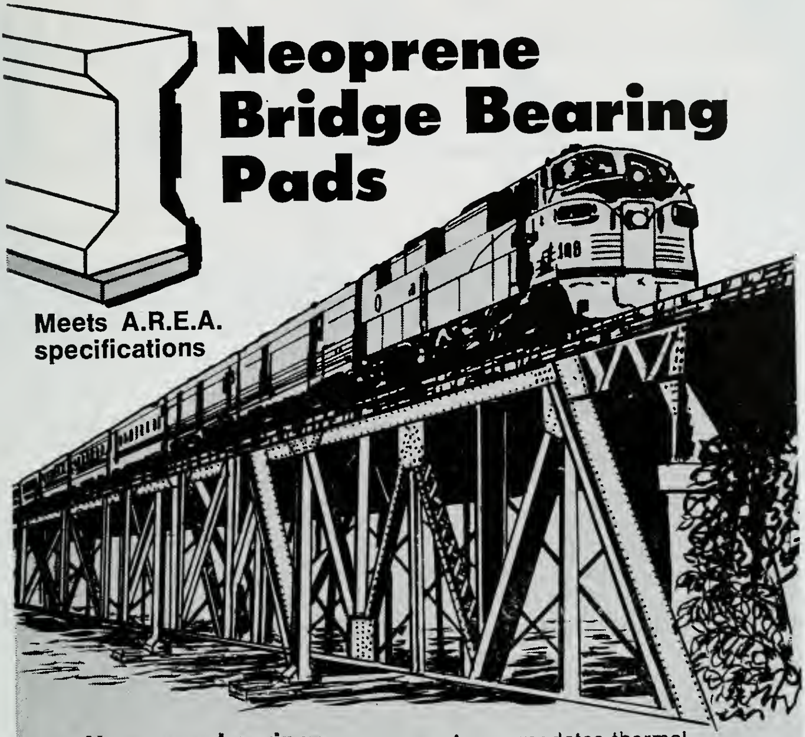

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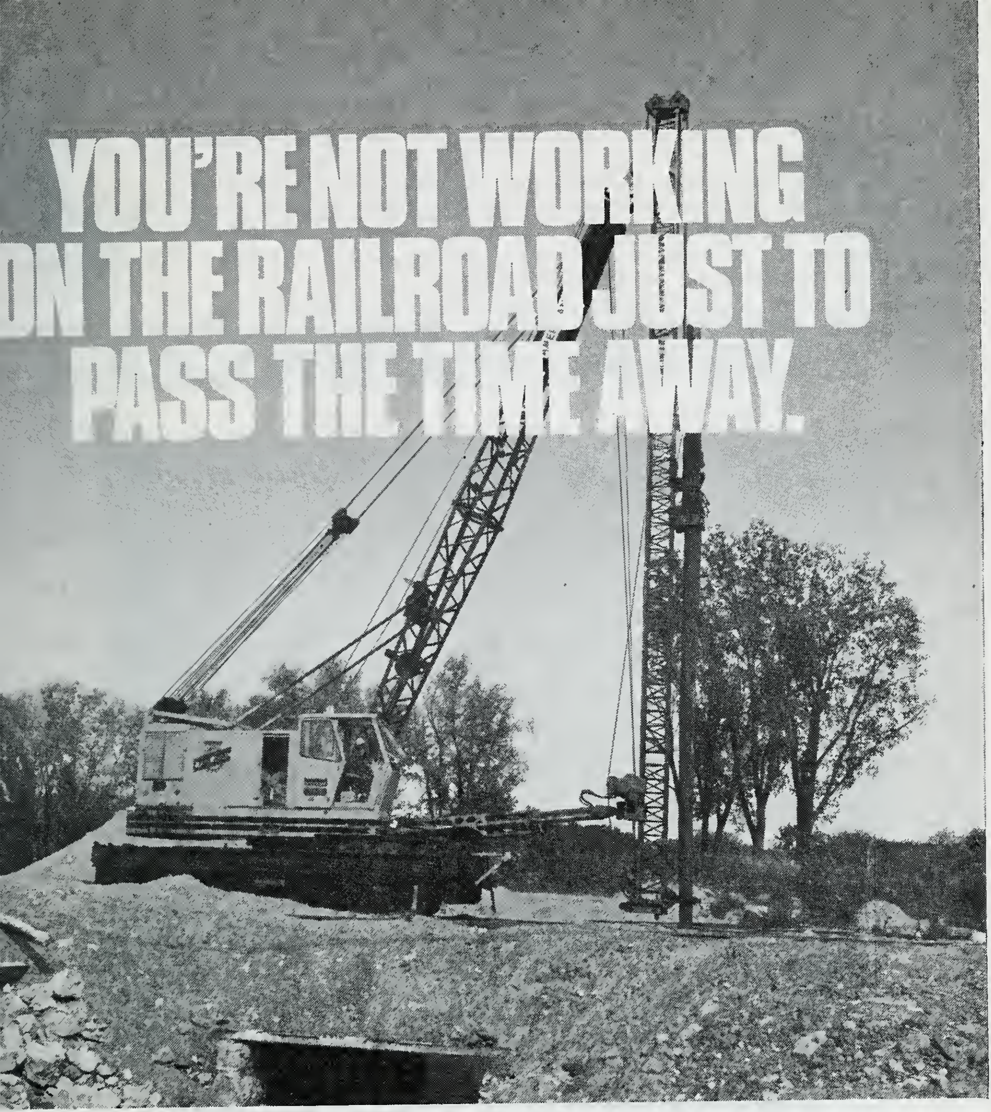

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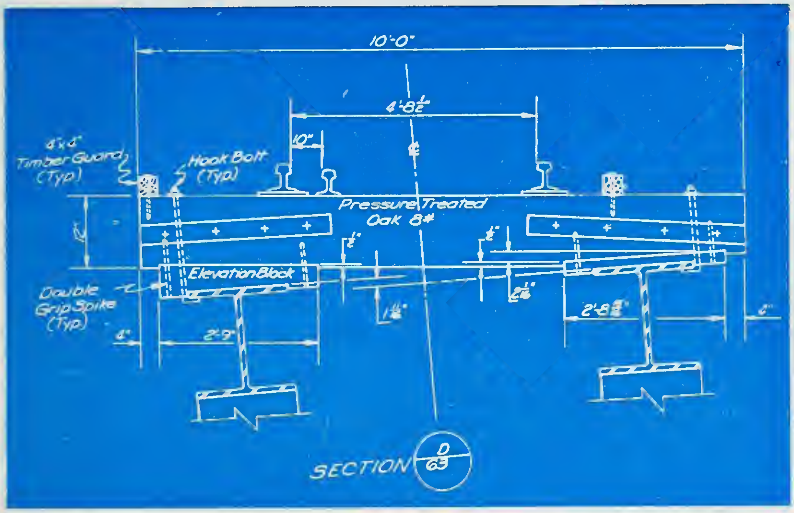

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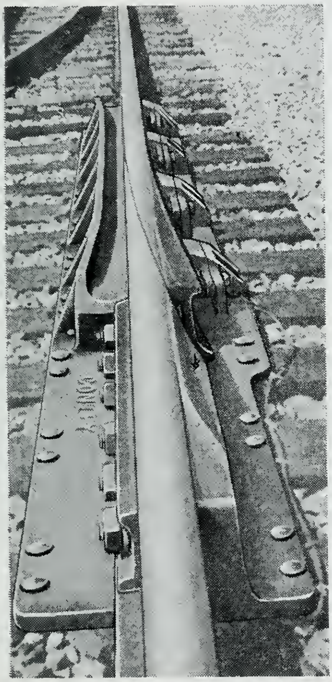

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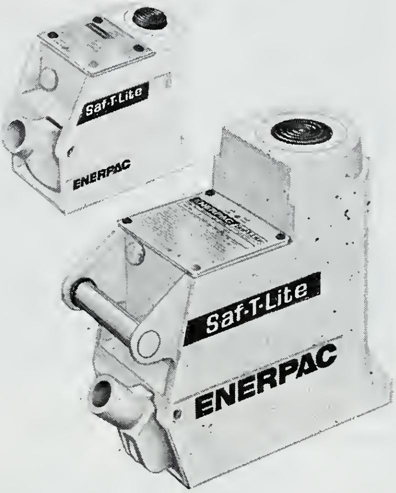

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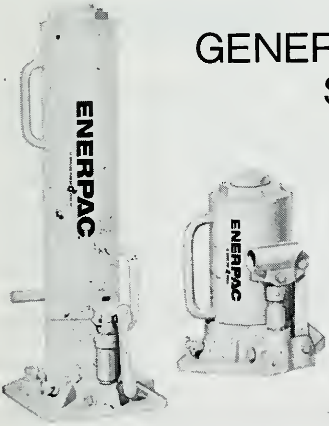

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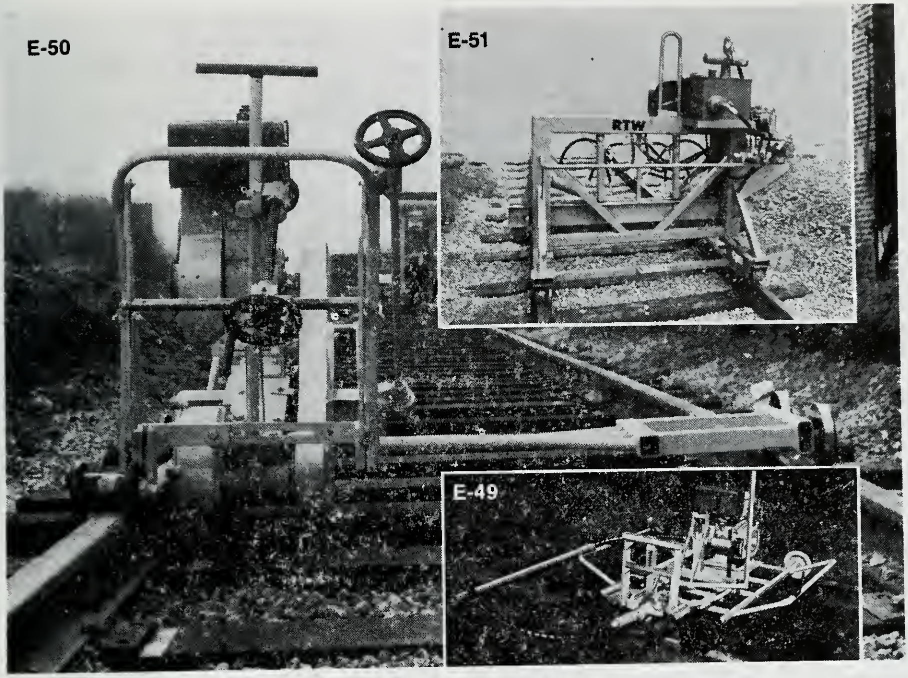

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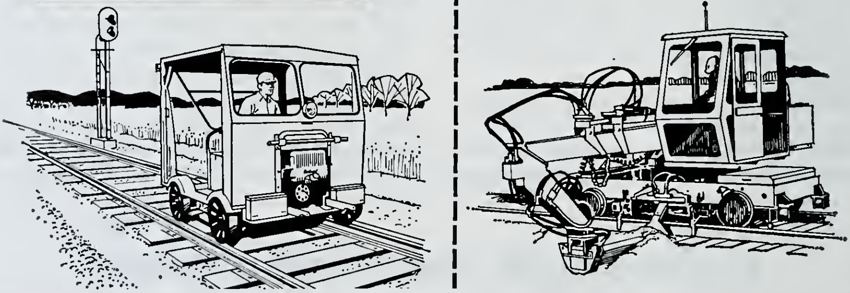

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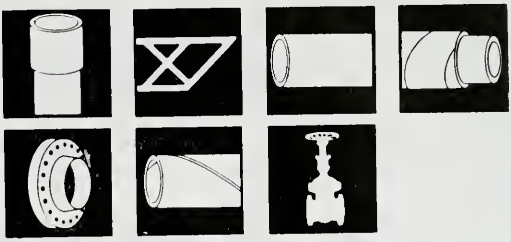

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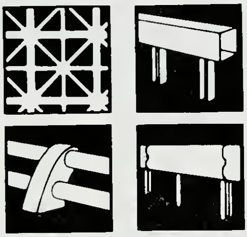

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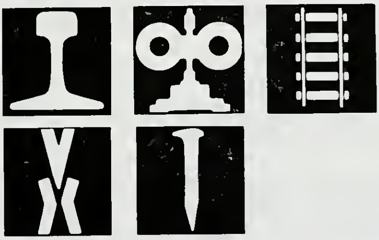

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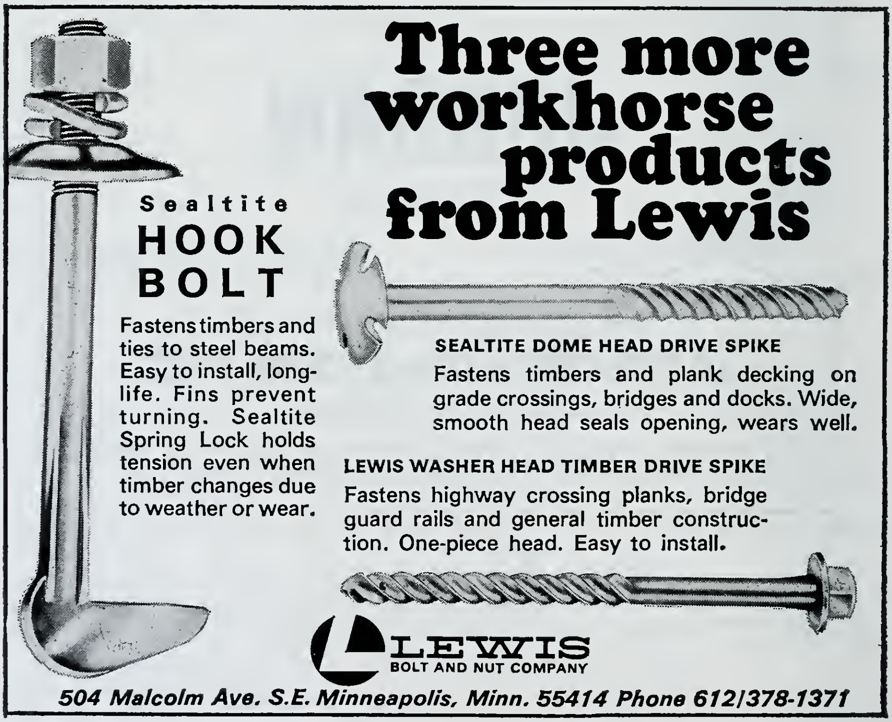

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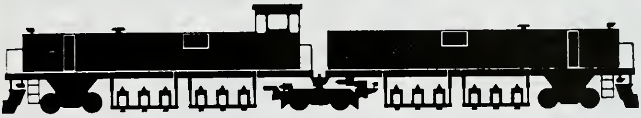

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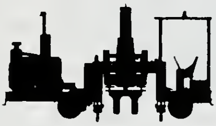

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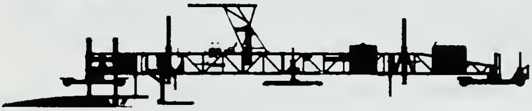

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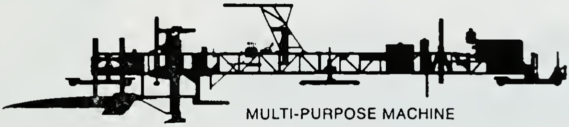

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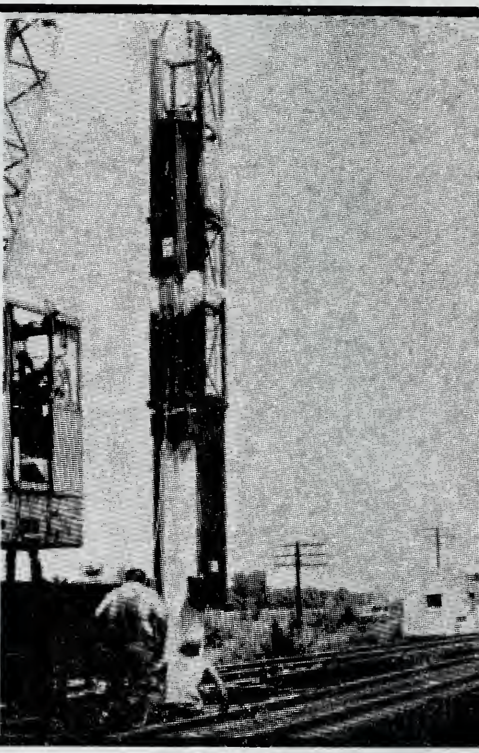

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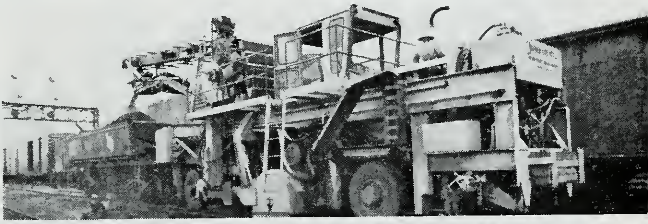

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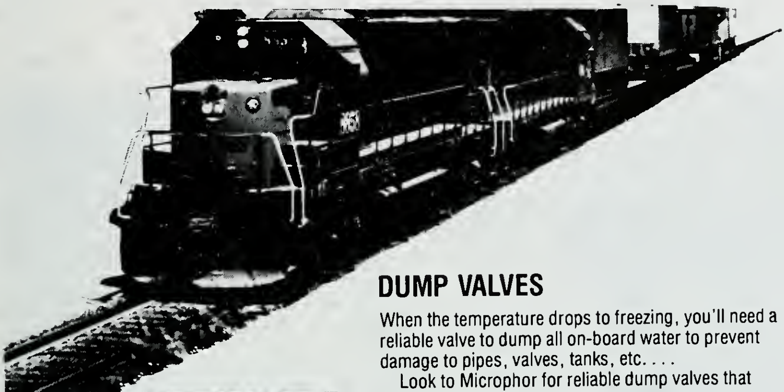

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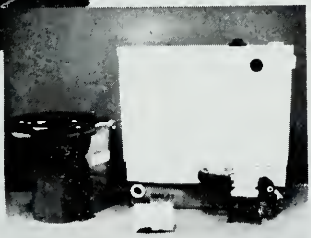

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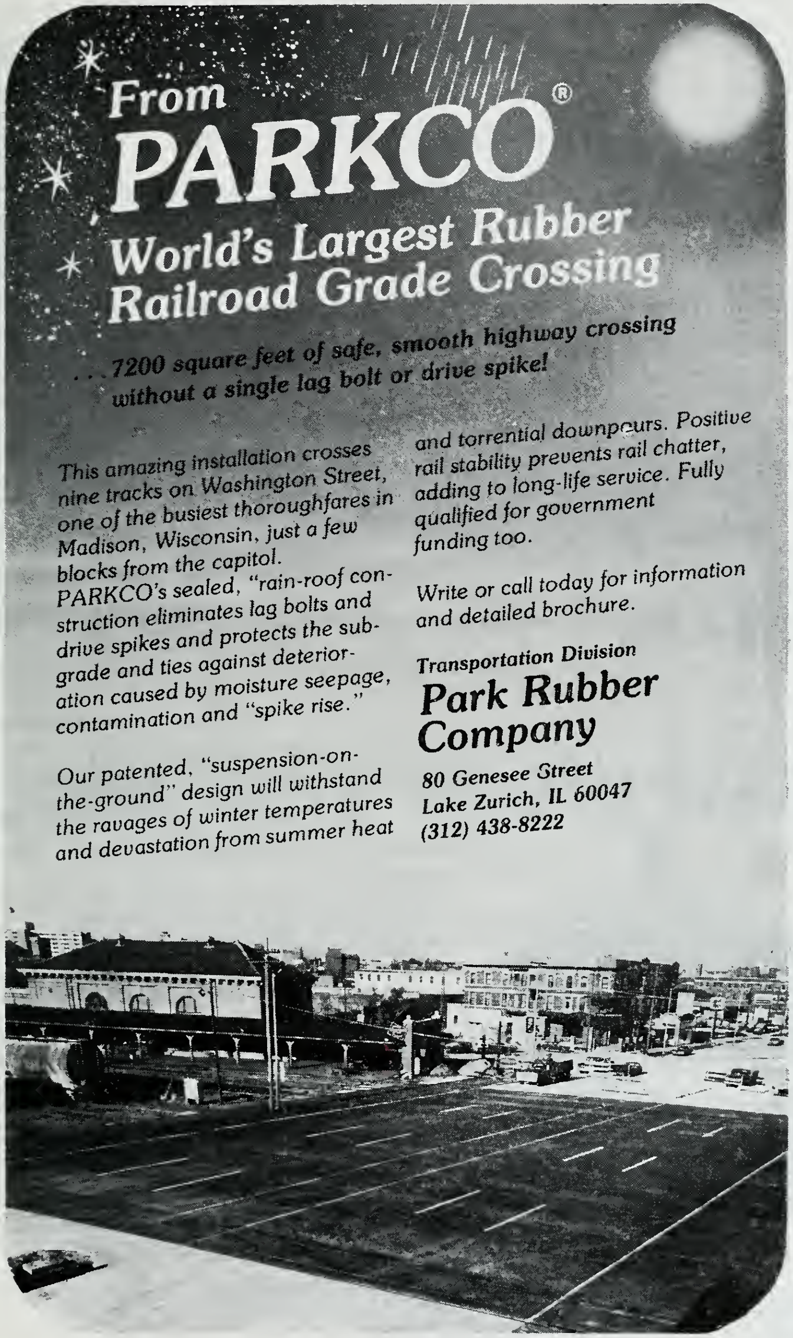

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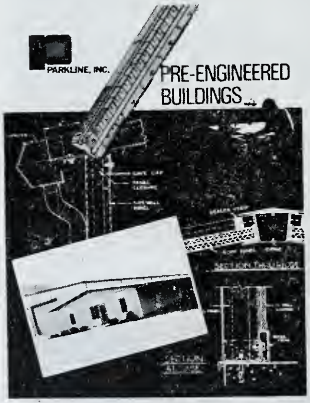

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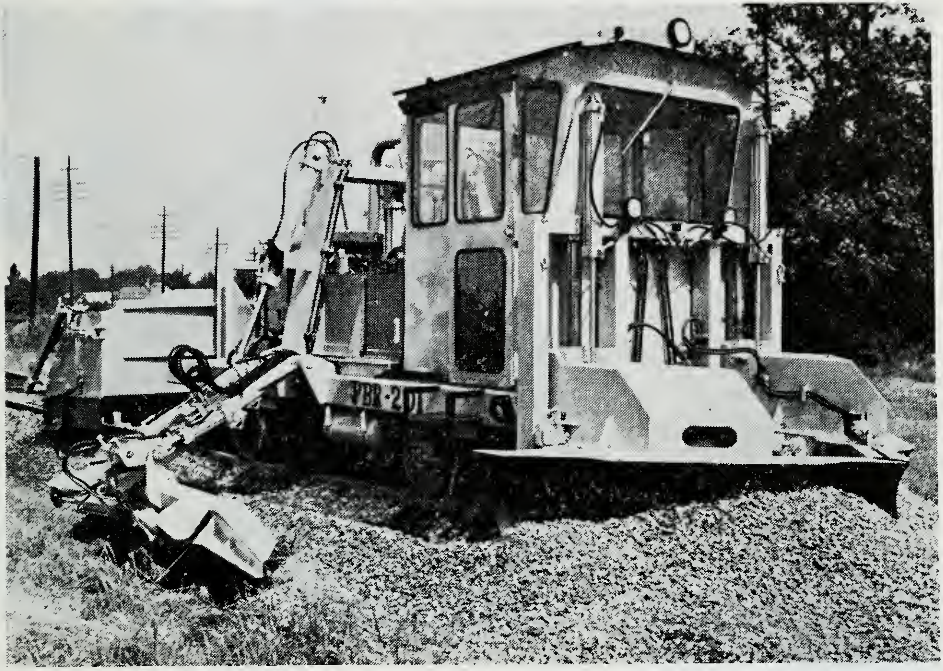

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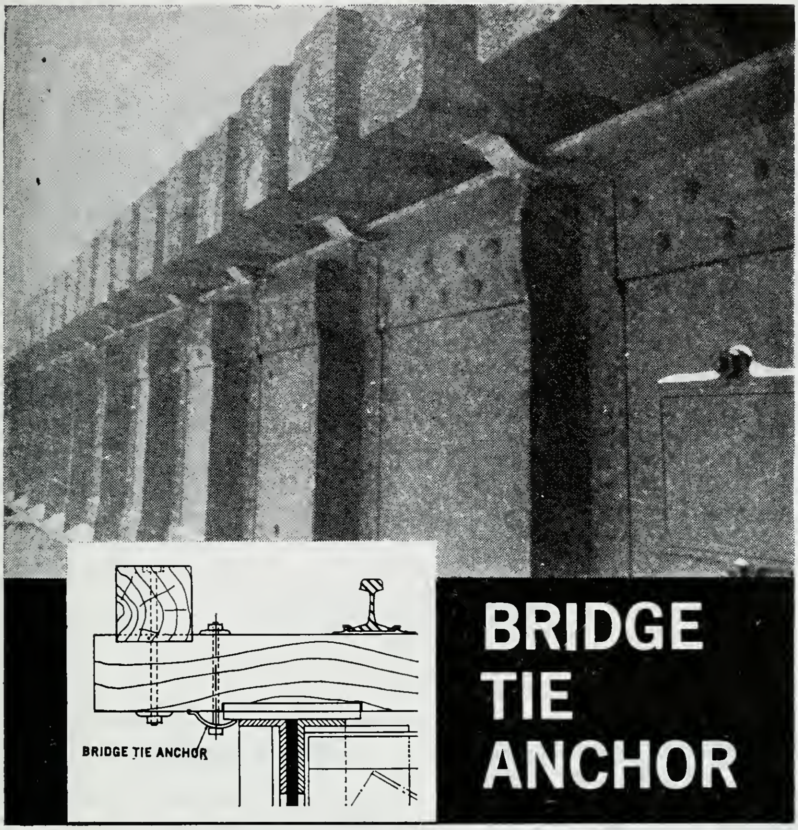

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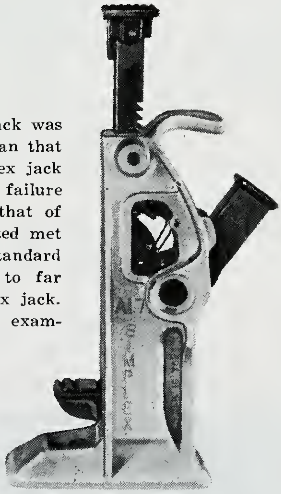

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